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FORM PTO-1390 (REV 10-95)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY DOCKET NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				17480P023
INTERNATIONAL APPLICATION NO PCT/AU00/01079		INTERNATIONAL FILING DATE September 8, 2000	U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 10/070883	
TITLE OF INVENTION TAP		PRIORITY DATE CLAIMED September 8, 1999		
APPLICANT(S) FOR DO/EO/US Mark Ian Johnson; Alfred Blochlinger; Brian Charles Hamann; Hugh Yean Fung				
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:				
<p>1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b)) and PCT articles 22 and 39(1).</p> <p>4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)).</p> <ul style="list-style-type: none">a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).b. <input type="checkbox"/> has been transmitted by the International Bureau.c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). <p>6. <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)).</p> <p>7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).</p> <ul style="list-style-type: none">a. <input type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).b. <input type="checkbox"/> have been transmitted by the International Bureau.c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.d. <input type="checkbox"/> have not been made and will not be made. <p>8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</p> <p>9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p>				
Items 11. to 16. below concern document(s) or information included:				
<p>11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included</p> <p>13. <input type="checkbox"/> A FIRST preliminary amendment.</p> <ul style="list-style-type: none"><input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment <p>14. <input type="checkbox"/> A subsequent specification.</p> <p>15. <input type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>16. <input checked="" type="checkbox"/> Other items or information:</p>				
Priority request; Formal drawings transmittal; International request form, International search report; PCT demand receipt-filed March 30, 2001, International Preliminary Examination Report; WIPO Information Sheet, PCT/IB/308				

US

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Annex US.II, page 2 PCT Applicant's Guide - Volume II - National Chapter - US

U.S. APPLICATION NO. (if known) 37 CFR 1.492(f)(2)(i)(B)(2)(D)(2)		INTERNATIONAL APPLICATION NO PCT/AU00/01079	ATTORNEY'S DOCKET NUMBER 17480P023																				
<p>17. <input checked="" type="checkbox"/> The following fees are submitted:</p> <p>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):</p> <p>Neither international preliminary examination fee (37 CFR 1.482 nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by EPO or JPO \$1040.00</p> <p>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO. \$890.00</p> <p>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee paid to USPTO (37 CFR 1.445(a)(2)) \$740.00</p> <p>International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00</p> <p>International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00</p>		CALCULATIONS FOR PTO USE ONLY																					
<p>ENTER APPROPRIATE BASIC FEE AMOUNT =</p> <p>Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).</p>		\$ 1040.00																					
<table border="1"> <thead> <tr> <th>CLAIMS</th> <th>NUMBER FILED</th> <th>NUMBER EXTRA</th> <th>RATE</th> </tr> </thead> <tbody> <tr> <td>Total claims</td> <td>25</td> <td>- 20 =</td> <td>X \$18.00</td> </tr> <tr> <td>Independent claims</td> <td>3</td> <td>- 3 =</td> <td>X \$84.00</td> </tr> <tr> <td colspan="3">MULTIPLE DEPENDENT CLAIM(S) (if applicable)</td> <td>+ \$280.00</td> </tr> <tr> <td colspan="3">TOTAL OF ABOVE CALCULATIONS =</td> <td>\$ 1410.00</td> </tr> </tbody> </table> <p>Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).</p>		CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	Total claims	25	- 20 =	X \$18.00	Independent claims	3	- 3 =	X \$84.00	MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$280.00	TOTAL OF ABOVE CALCULATIONS =			\$ 1410.00	\$	
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<p>TOTAL NATIONAL FEE =</p> <p>Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property</p>		\$ 1410.00																					
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<p>a. <input checked="" type="checkbox"/> A check in the amount of \$ 1410.00 to cover the above fees is enclosed.</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 022666. A duplicate copy of this sheet is enclosed.</p>																							
<p>NOTE: Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</p>																							
<p>SEND ALL CORRESPONDENCE TO:</p> <p>Blakely, Sokoloff, Taylor & Zafman LLP 12400 Wilshire Blvd. 7th Floor Los Angeles, CA 90025-1026</p>																							
 <p>SIGNATURE Eric S. Hyman NAME</p>																							
<p>30,139 REGISTRATION NUMBER</p>																							

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TAP

This invention relates to a tap.

5 One aspect of the invention concerns the provision of a safety button which needs to be operated before a tap handle can be used to dispense liquid therefrom.

This feature can be incorporated into a novel tap which is arranged to dispense chilled water and boiling water (or near boiling) from a boiling water unit.

10 Other aspects of the invention concern details of the way in which the valve assembly is constructed and functions.

In accordance with one aspect of the invention there is provided a tap including a
15 tap body within which is located a valve, an operating handle mounted on the body and coupled to the valve, a security button which is interlocked with the handle and/or valve, the arrangement being such that the valve can only be opened after activation of the security button.

20 Preferably, the handle is mounted for rotation such that rotational movement from a central position in a first direction causes delivery of a first liquid from the valve and rotation of the handle in a second direction, opposite to the first, causes delivery of the second liquid, subject to operation of the security button.

25 Preferably further, in the second position, activation of the security button permits rotation of the handle about an orthogonal axis to allow delivery of the second liquid.

In accordance with another aspect of the invention there is provided a dual valve having a pair of valve elements which are mounted for rotation relative to one another and
30 wherein one of the valve elements includes an inlet port and an outlet port and the other of the valve elements includes a recess, the arrangement being such that when the valve

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elements are rotated so that the recess overlies, at least in part, both of said ports, fluid can flow into one of the ports through the recess and out of the other port. Preferably, the valve elements are ceramic.

5 The invention also provides a tap having a handle which is mounted for biaxial rotation, the tap including a valve assembly which includes a plunger and means for coupling the plunger to the handle so that the plunger rotates with the handle about one axis but is unseated from a valve seat when the handle is rotated about an orthogonal axis.

10 The invention also provides a tap having a valve assembly, the valve assembly being located within a fixed sleeve, the valve assembly including first and second sleeve components which are interlocked together and have therebetween a diaphragm and means for causing selective displacement of the diaphragm from a valve seat to thereby open and close the valve.

15

The invention will now be further described with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a dual tap of the invention mounted for dispensing cold water and boiling water;

20 Figure 2 is a more detailed cross-sectional view of the tap;

Figure 3 is a more detailed transverse cross-sectional view of the tap;

Figure 4 is a simplified cross-sectional view on a larger scale;

Figures 5A and 5B are schematic views which illustrate the function of the tap;

Figure 6 is a side view of the main body of the tap;

25 Figure 7 is a front view of the body;

Figure 8 is a plan view of the main body;

Figure 9 is an underside view of the main body;

Figure 10 is a cross-sectional view along the line 10-10;

Figure 11 is a side view of an upper tap body part;

30 Figure 12 is a front view of the upper body part;

Figure 13 is a plan view of the upper body part;

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Figure 14 is an underside view of the upper body part;

Figure 15 is a cross-sectional view along the line 15-15;

Figure 16 is a fragmentary cross-sectional view along the line 16-16;

Figure 17 is a side view of the handle;

5 Figure 18 is a front view of the handle;

Figure 19 is an underside view of the handle;

Figure 20 is a plan view of the handle;

Figure 21 is a rear view of the handle;

Figure 22 is a cross-sectional view along the line 22-22;

10 Figure 23 is a cross-sectional view along the line 23-23;

Figures 24 and 25 are more detailed fragmentary views of part of the handle;

Figure 26 is a side view of the handle cap;

Figure 27 is an underside view of the handle cap;

Figure 28 is a plan view of the handle cap;

15 Figure 29 is a rear view of the handle cap;

Figure 30 is a front view of the handle cap;

Figure 31 is a cross-sectional view along the line 31-31;

Figure 32 is a cross-sectional view along the line 32-32;

Figure 33 is a side view of a valve mounting plate;

20 Figure 34 is an underside view of the valve mounting plate;

Figure 35 is a plan view of the valve mounting plate;

Figure 36 is an enlarged cross-section along the line 36-36;

Figure 37 is an underside view of a ceramic disc;

Figure 38 is a plan view of the ceramic disc;

25 Figure 39 is a sectional view along the line 39-39;

Figure 40 is plan view of a ceramic insert;

Figure 41 is a sectional view along the line 41-41;

Figures 42 and 43 are fragmentary cross-sectional views illustrating the manner in which the ceramic disc and insert co-operate;

30 Figure 44 is a side view of plunger;

Figure 45 is an underside view of the plunger;

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Figure 46 is a plan view of the plunger;
Figure 47 is a cross-sectional view along the line 47-47;
Figure 48 is a cross-sectional view along the line 48-48;
Figure 49 is a side view of a valve diaphragm.
5 Figure 50 is an underside view of the diaphragm;
Figure 51 is a plan view of the diaphragm;
Figure 52 is a cross-sectional view along the line 52-52;
Figure 53 is a side view of any outer valve sleeve;
Figure 54 is another side view of the outer valve sleeve;
10 Figure 55 is an underside view of the outer valve sleeve;
Figure 56 is a plan view of the outer valve sleeve;
Figure 57 is a cross-sectional view along the line 57-57;
Figure 58 is a cross-sectional view along the line 58-58;
Figure 59 is an end view of an inner valve.
15 Figures 60 and 61 are side views of the inner valve sleeve;
Figure 62 is an underside view of the inner valve sleeve.
Figure 63 is a plan view of the inner valve sleeve;
Figure 64 is a cross-sectional view along the line 64-64;
Figure 65 is a cross-sectional view along the line 65-65;
20 Figure 66 is a side view of a child lock button;
Figure 67 is an underside view of the button;
Figure 68 is a plan view of the button;
Figure 69 is a front view of the button;
Figure 70 is a cross-sectional view along the line 70-70;
25 Figure 71 is a side view of a handle sleeve;
Figure 72 is an underside view of the handle sleeve;
Figure 73 is a plan view of the handle sleeve;
Figure 74 is a front view of the handle sleeve;
Figure 75 is a cross-sectional view along the line 75-75;
30 Figure 76 is a more detailed fragmentary cross-sectional view of part of the handle
sleeve;

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Figure 77 is a side view of a handle mounting pin;
Figure 78 is a side view of a handle mounting plate;
Figure 79 is an end view of the handle mounting plate; and
Figure 80 is a plan view of the handle mounting plate.

5

Figure 1 schematically illustrates a dispensing system 2 for dispensing cold and boiling water from a tap 4. The tap 4 includes a body 6, outlet nozzles 8 and 10 and operating handle 12. Within the body 6 and coupled to the handle 12 is a valve assembly 14. The system includes a boiler 16 which has a cold water inlet 18, boiling water outlet 20 and vent outlet 22. The valve assembly 14 receives chilled water on inlet line 24 and cold water on inlet line 26. It is not energy efficient to supply chilled water to the boiler 16 and so a separate inlet line 26 is provided for this purpose. The valve assembly is arranged to deliver cold water via line 28 to the cold water nozzle 10 or cold water to the inlet 18 of the boiler via line 30. As will be explained below, the user operates the handle 12 in order 10 to deliver either chilled water directly to the nozzle 10 or cold water to the inlet 18 of the boiler by manipulation of the handle 12. When the boiler 16 receives cold water at its inlet 18, boiling water is expelled from the outlet 20 and delivered to the nozzle 8 by means of a boiling water line 32. A vent line 34 is connected from the vent outlet 22 to a vent opening 36 adjacent to the nozzles 8 and 10. Normally the nozzles 8 and 10 will be located above a 15 sink or the like so that any condensation produced at the vent opening 36 will drip into the sink.
20

Because the preferred embodiment of the invention is capable of delivering chilled water and boiling water from a single tap, the tap 4 includes a child safety button to 25 prevent inadvertent delivery of boiling water.

Figure 2 illustrates in more detail the tap 4 of the invention. It will be seen that the valve assembly 14 is mounted within the valve body 6 by means of three upper mounting screws 38, only one of which is shown in Figure 2. The handle 12 is capable of biaxial 30 rotation. It is rotatable about a vertical axis 40. Rotation of the handle 12 anti-clockwise from a central position (as seen from above) will cause delivery of chilled water to the

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nozzle 10. Rotation of the handle 12 in a clockwise direction does not cause the assembly 14 to deliver water from the boiling water outlet nozzle 8. First, a child safety button 42 must be activated to then permit the handle 12 to be rotated downwardly so as to permit boiling water to be delivered from the boiler 16 through the nozzle 8. The handle 12 5 pivots about a horizontal axis 44 which is formed between the handle 12 and the valve assembly 14, as will be described in more detail below.

The valve assembly 14 includes a valve plate 50, as best seen in Figures 3 and 4. The valve plate 50 has soldered thereto the lines 24, 26, 28 and 30. These communicate 10 with ducts extending through the valve plate, as will be described in more detail below. The valve plate also cooperates with a ceramic valve disc 52. The valve disc 52 is provided with a recess 54. On rotation of the disc 52 about the axis 40, the recess 54 can be aligned with the ducts which connect with the lines 24 and 28 thereby enabling delivery 15 of chilled water to the nozzle 10. The disc 52 has a bore 56 therethrough which can be aligned with a bore through the plate 50 which is coupled to the line 30 on appropriate rotation of the disc 52. The valve assembly includes a plunger 58 which prevents unchilled water from the line 26 entering the chamber 60 until the plunger 58 is elevated. Elevation of the plunger 58 occurs when the handle 12 is pressed downwardly causing 20 rotation about the axis 44. This permits unchilled water to pass from the line 26 into the chamber 60 and then through the bore 56, plate 50 and into the line 30 extending to the inlet of the boiler 16. This operation will be described in more detail below. Unchilled water entering the inlet of the boiler causes boiling water to be delivered to the nozzle 8 via 25 the line 32.

25 The tap body 6 is formed in two parts, a main lower part 62 and an upper part 64. The lower part 62 is illustrated in more detail in Figures 6 to 10. Both parts are preferably injection moulded from plastics material. The lower part includes a cylindrical body portion 66 formed with internal ribs 68 which form a support for the valve assembly 14. The main lower part 62 includes a lower spout portion 69 formed with an opening 70 for 30 receipt of the nozzles 8 and 10 which are preferably formed as an integral moulding. The lower and upper parts 62 and 64 preferably have complementary rims so that the parts

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interlock together. A screw recess 72 is provided in the spout portion 69 for receipt of a screw which is received in a nut (not shown) formed in a boss 74 which is formed in the upper part 64, as best seen in Figures 14 and 15. The lines 28, 32 and 34 are located between the body portion 66 and the valve assembly 14.

5

The upper part 64 is illustrated in more detail in Figures 11 to 16. It is provided with a part spherical bearing surface 76 for supporting the biaxial rotation of the handle 12 about the axes 40 and 44. As best shown in Figure 13, the inner rim 78 of the bearing portion 76 is formed with a tapered cam member 80 which interlocks with part of the child lock button 42, as will be described in more detail below. The rim 78 also includes first and second notches 82 and 84 which also cooperate with the handle 12, as will be described below.

10 The handle 12 is illustrated in more detail in Figures 17 to 25. Generally speaking, the handle 12 performs a number of functions. First, it is coupled to the valve assembly 14 so that anti-clockwise rotation of the handle 12 about the vertical axis 40 will cause chilled water to flow from the nozzle 10. On rotation of the handle 12 in a clockwise direction followed by pressing in the button 42 permits the handle 12 to be rotated downwardly about the axis 44. This causes lifting of the plunger 58 whereby boiling water can be delivered. As best seen in Figure 22, the handle 12 is moulded with a handle chamber 86 to provide access to components which interconnect the handle 12 with the valve assembly 14. A handle cap 88 is provided to cover the chamber 86. The handle cap 88 is shown in more detail in Figures 26 to 32. The chamber 86 is defined by sidewalls 82 and a base 85 having upper and lower faces 87 and 89. The base 85 includes a pair of forward recesses 90, a central bore 92 and a pair of rear recesses 94 which are located on opposite sides of a square opening 93. Projecting upwardly from the upper face 87 of the base 85 is a guide boss 96 located between the rear recesses 94. A slot 246 is formed in the upper face 87 and it extends from the sidewall 83 to a point just beyond the central bore 92. A pair of slots 91 are also formed in the upper face 87 and these extend perpendicularly relative to the slot 246 and are located on either side of the square opening 93. The slots 91 open to the forward recesses 90. On the lower face 89 the recesses 90 connect with the square

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opening 93 and co-operate to define bridge members 95 which are used to form part of the pivot coupling to the valve assembly to permit rotation about the horizontal axis 44. The bore 92 receives the upper end of the plunger 58. The recesses 94 receive downwardly extending fingers 98 formed on the underside of the cap 88. The handle also includes a forward recess 262 for receipt of forward cap fingers 260 for removably mounting of the cap 88. The guide boss 96 cooperates with the button 42 as will be described in more detail below.

As best seen in Figures 19, 22 and 23, the underside of the handle 12 includes an annular recess 100 for receipt of a handle sleeve 102. The handle sleeve 102 is shown in more detail in Figures 71 to 76. The handle sleeve 102 includes part spherical (concave) bearing surface 104 which is complementary in shape to the (convex) bearing surface 76 formed on the top body portion 64. This facilitates rotational movement of the handle 12 about the axes 40 and 44.

15

As best seen in Figure 21, the handle 12 includes a rear opening 106 which in use receives the button 42. The opening 106 extends from the outer wall of the handle and through the sidewall 83.

20

The button 42 is illustrated in more detail in Figures 66 to 69. The button includes an outer press plate portion 108 projecting downwardly from a body portion 110. The interior of the body portion 110 includes a keyway 112 which is generally complementary in shape to the guide boss 96 of the handle 12. This enables the button 42 to be slidably mounted in the opening 106 of the handle 12. As best seen in Figure 2, a compression spring 114 acts between the opposed faces of the boss 96 and a wall portion 116 of the button 42 defined at the inner end of the keyway 112. The wall 116 may include a spring locating boss 118 for the one end of the spring 114. The other end of the spring 114 is supported by a second spring locating boss 113 formed on the guide boss 96, as best seen in Figure 25.

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Figure 24 diagrammatically shows the guide boss 96 located within the keyway 112 of the button 42. The button 42 also includes an interlocking projection 120 as shown in Figure 70 which extends rearwardly from the wall 116 and cooperates with the cam 80 on the upper tap portion, as will be described below.

5

As shown in Figure 4, the button 42 is in its extended position and the outer press plate 108 projects from the surface of the handle 12. Also, it will be seen that the interlocking projection 120 engages the underside of the cam 80. This prevents the handle 12 being rotated about the horizontal axis 44.

10

Figure 5A diagrammatically shows the handle 12 in a position in which it has been rotated clockwise from its central position so that the projection 120 lies adjacent to a narrow portion 122 of the cam 80. The button 42 is also shown in a position in which it has been slid inwardly in the opening 106 against the resilient bias of the spring 114. The 15 projection 120 is now clear of the narrow portion 122 of the cam and the user can apply downward force on the handle 12 in order to rotate the handle 12 about the horizontal axis 44 to the position shown in Figure 5B. This causes a levering up of the plunger 58 which permits flow of boiling water from the boiler 16. The projection 120 has an inclined face 121 which is presented to the cam 80 to facilitate disengagement therewith so as to ensure 20 that the button returns to its retracted position as shown in Figure 4.

The valve assembly 14 will now be described in more detail with reference to Figures 33 to 65.

25 Figures 33 to 36 illustrate the valve mounting plate 50 in more detail. The mounting plate 50 is preferably machined from brass. It has a base portion 130, central body 132 and spigot 134. The body 132 is provided with a groove for receipt of an O-ring 136 and the spigot 134 is provided with a pair of grooves for receipt of a pair of O-rings 138. The base 130 is formed with stepped bores 140, 142, 144 and 146 which form ports 30 for the valve. The bores 140 and 146 form mounting points for the copper lines 24 and 28. A bore 135 extends through the spigot 134 and communicates with the bore 42 which

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forms a mounting point for the inlet line 26 and the bore 144 forms a mounting for the line 30 which extends to the inlet 18 of the boiler 16. The base portion 130 is provided with three threaded sockets 148 for receipt of the upper mounting screws 38 and a pair of diametrically opposed threaded sockets 150 for receipt of the lower mounting screws 152.

5 The edge of the base portion 130 includes recesses 149 to provide a space between the base portion 130 and the cylindrical body portion 66 of the tap body for the lines 28, 32 and 34.

As best seen in Figure 3, a pair of lower mounting screws 152 couple the base 10 portion 130 to a lower mounting plate 154 for fixing the valve assembly 14 in the cylindrical body portion 66 of the tap.

The central body portion 132 includes an upper valve face 153 against which the ceramic valve disc 52 is seated. The face 153 includes a crescent shaped recess 156 in 15 which a complementary shaped ceramic insert 158 is located. The insert 158 has a bore 160 which is aligned with the bore 140 of the plate 50. As best seen in Figure 40, the insert 158 has a second bore 162 which is aligned with the bore 146. The top of the insert 158 is flush with the face 153 and also bears against the adjacent surface of the ceramic disc 52 in a watertight manner.

20

The ceramic disc 52 and ceramic insert 158 are shown in more detail in Figures 37 to 41. It will be seen that the disc 52 includes a central bore 164 through which the spigot 134 passes. The lower face 166 of the disc 52 includes a part annular recess 168 which extends through about 55% of arc. The disc also includes a bore 170 and diametrically 25 opposed keyways 169 on its outer periphery. The keyways 169 enable interlocking with other parts of the valve assembly so that the disc 52 is rotated with the handle 12 when it is rotated about the axis 40 but the mounting plate 50 remains stationary.

Figure 42 shows the position of the upper ceramic disc 52 when the handle 12 has 30 been rotated anti-clockwise from centre for delivery of chilled water. In this position, the recess 168 forms a passageway between the bores 140 and 146 thereby enabling delivery

- 11 -

of chilled water from the line 24 to the line 28. The disc 52 closes the bore 144 in this position.

In Figure 43, the handle 12 has been rotated in an anti-clockwise direction from 5 centre so that the bore 170 is aligned with the bore 144. This enables water from within the chamber 60 to pass through the aligned bores 170 and 144 and into the line 30. As mentioned previously, this will only occur once the handle 12 has been pressed so as to lift the plunger 58. The disc 52 closes the bores 140 and 146 in this position.

10 The valve assembly 14 further includes an outer valve sleeve 171 and upper and lower inner valve sleeves 172 and 174. The inner valve sleeves 172 and 174 are interlocked together, a resilient diaphragm 176 being held between the interlocked components, as shown in Figures 2 and 4. This effectively seals the valve chamber 60 at the upper end. The interlocked inner sleeve components are located within the outer sleeve 15 171 and are coupled to the handle 12 for rotation therewith whilst the outer sleeve remains stationary. The outer sleeve 171 also forms a mounting point for an upper mounting plate 178. The heads of the upper screws 38 extend from the upper mounting plate 178 to the threaded sockets 148 in the valve mounting plate 50. A bearing ring 179 is located above the lower inner sleeve 174 and beneath the upper mounting plate 178 to facilitate rotation 20 of the interconnected sleeves 172 and 174 about the axis 40.

The lower inner sleeve 174 is shown in more detail in Figures 53 to 58. It is integrally moulded from plastics material as a hollow wasted cylindrical body 180. The upper part of the lower sleeve 174 receives the upper sleeve 172 and the lower part of the 25 sleeve 174 defines most of the valve chamber 60. The upper part of the sleeve 174 is provided with resilient fingers 182 for interlocking with the sleeve 172. The lower part of the body includes a cylindrical recess 184 which overlies the central body portion 132 of the valve mounting plate 50, the O-ring 136 forming a seal therewith, as best seen in Figure 4. As best seen in Figure 55, the upper wall of the sleeve 174 includes projecting 30 keys 186 which are complementary to the keyways 169 formed in the periphery of the ceramic disc 52. In use the ceramic disc 52 is held snugly within the lower sleeve 174 and

- 12 -

is rotatable therewith. Preferably the key 186 and keyways 169 permit coupling in a single way.

The interior of the sleeve 174 is moulded with a downward skirt 181 having a lower edge 183. The sleeve includes a central bore 193 which is surrounded by a valve seat 195. As best seen in Figure 58, the body 180 is moulded with a passageway 188 which extends from the narrow central portion of the body to the recess 184. Normally a valve element 190 is integrally formed in the middle of the diaphragm 176 is seated against the upper end of the spigot 134 to seal the bore 142 therethrough. Also, a lower face 237 of the central body portion of the diaphragm is biased into sealing engagement with the valve seat 195. When the plunger 58 is raised, the valve element 190 and face 237 are unseated which permits flow of water through the bore 142, beneath the diaphragm 176 through the passage 188 into the chamber 60. Water in the chamber 60 can then flow out of the bore 144 when the disc 52 is in the position as shown in Figure 43. As best seen in Figure 57, the narrow part of the body 180 is formed with an annular groove 192 which receives part of a peripheral rim 194 provided on the diaphragm 176.

The upper sleeve 172 is illustrated in more detail in Figures 59 to 65. It is in the form of a hollow cylindrical body 200 having recesses 202 for receipt of the fingers 182 of the lower sleeve 174. The body 200 includes a central closed recess 204 within which the plunger 58 is chiefly located. The recess 204 defines in part the valve chamber 60. The body 200 has an upper wall 206 including a hole 208 through which part of the plunger in use extends. The lower face 210 of the body 200 is formed with a lip 212 adjacent to the recess 204. The lip 212 also interlocks with the rim 194 of the diaphragm so that the diaphragm is sealingly clamped between the upper and lower sleeves 172 and 174.

The upper wall 206 of the body 200 is formed with a post 214 formed with laterally extending pivot shafts 216. Diametrically opposite to the post 214 is a projecting tongue 218. An axial locating passageway 219 is moulded in the sidewall of the body 200. This co-operates with an axial rib 221 formed on the inner wall of the lower sleeve 174 to thereby ensure these parts are properly located. In the assembled tap, the post 214 extends

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into the square opening of the base 85 of the handle. The pivot shafts 216 extend in the respective recesses 90 and are located just beneath the bridge members 95. The pivotal connection of the handle to the valve assembly is completed by using a locking plate 220 to lock the pivot shafts 216 in the recesses 90. The locking plate 220 is illustrated in more 5 detail in Figures 78 to 80. It is generally L-shaped in cross-section and has a pair of spaced finger portions 222. The interlocking is accomplished by arranging for the finger portions 222 to be slid along the slots 91 from above the base 85 of the handle so that they underlie the pivot shafts 216. The pivot shafts 216 are then held captive between the fingers 222 and the bridge members 95, as diagrammatically illustrated in Figure 4 and Figures 5A and 10 5B.

The upper mounting plate 178 is provided with a control opening 179 to permit the plunger 58 to pass therethrough. The plate 178 is also provided with annular slots 177 to permit the tongue 218 and post 214 to pass therethrough and be rotatable about the vertical 15 axis 40 as shown in Figure 4.

The plunger 58 is illustrated in more detail in Figures 44 to 48. It includes a plunger shaft 230 integrally formed with a main body portion 232 having a lower recess 234. The lower recess 234 in use receives a central body portion 236 of the diaphragm 20 176. The plunger shaft 230 includes a transverse bore 238. As best seen in Figure 4, the plunger shaft 230 passes through the opening 208 in the upper sleeve 172 and is received within the bore 92 of the handle. An L-shaped pin 240 as shown in Figure 77 having horizontal and vertical legs 242 and 244 is used to couple the upper end of the plunger 25 shaft 230 to the handle. The horizontal leg 242 of the pin 240 extends in the horizontal slot 246 in the upper face 87 of the floor 85 of the handle and through the bore 238 in the plunger shaft 230. The tongue 218 formed on the upper sleeve 172 extends through a curved slot in the plate 178 and is received between a pair of fingers 250 projecting downwardly from the lower face 87. The tongue 218 thus forms a second coupling point 30 between the valve assembly 14 and the handle 12 so as to assist in transferring rotational movement of the handle 12 about the axis 40 to the inner sleeves 172 and 174. The plunger 58 is mounted for sliding movement in the recess 204, the brain body portion 232

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being guided by the recess 204. A compression spring 59 acts between the recess 204 of the upper sleeve 172 and the main body portion 232 of the plunger 58. The spring 59 therefore normally forces the valve element 190 and lower face 237 of the diaphragm 176 into firm resilient sealing engagement with the upper end of the spigot 134 and valve seat 5 195 so as to form a watertight seal.

As best seen in Figures 26 and 29, the handle also includes a hollow projecting spigot 264 which in use receives the vertical leg 244 of the pin 240 so as to prevent inadvertent withdrawal of the pin 240 from the slot 246. This interconnection also permits 10 horizontal pivoting of the handle about the axis 44.

The handle sleeve 102 includes a generally hollow body 103 moulded with a locating plate 270 which projects downwardly from its underside front face. The lower edge 272 of the locating plate 270 in use passes over the rim 78 of the top body portion 64 15 of the tap. The edge is thus engagable with the notches 82 and 84. The notch 82 enables the user to discern a central position of the handle 12. The notch 84 is deeper than the notch 82 and enables the user to discern when the handle 12 has been rotated to its fullest extent in a clockwise direction. The depth of the notch also enables downward movement of the handle by rotation about the axis 44. The sleeve 102 also includes upper and lower 20 openings 274 and 276 in the surface 104. These openings define a bridge portion 278. The upper opening 274 is generally aligned with the rear opening in the handle 12. These openings permit sliding movement of the button 42. The bridge portion 278 limits outward movement of the button 42 under the influence of the spring 114.

25 The tap of the invention can be made in a variety of materials. A prototype has been constructed in which major parts are made from the following materials:

lower body part and upper body part 62 and 64: ABS polycarbonate

handle 12: diecast zinc

diaphragm 176: nitrile

30 valve plate 50: brass

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outer valve sleeve 171, upper and lower inner valve sleeves 172, 174, plunger 58,
handle sleeve 102, nozzles 8 and 10, cap 88, button 42: acetal plastic
mounting plates 154 and 178: stainless steel
spring 260: stainless steel
5 ring 179: teflon

Many modifications will be apparent to those skilled in the art without departing
from the spirit and scope of the invention.

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CLAIMS:

1. A tap (4) including a tap body (6) within which is located a valve (14), an operating handle (12) mounted on the body and coupled to the valve, a security button (42) which is interlocked with the handle and/or valve, the arrangement being such that the valve can only be opened after activation of the security button.
2. A tap as claimed in claim 1 wherein the body is provided with a first part spherical bearing surface (76) and the handle is provided with a complementary bearing surface (104) whereby the handle is capable of biaxial rotation about vertical and horizontal axes (40,44).
3. A tap as claimed in claim 2 including outlet means (8,10), a chilled water supply line (24) and a cold water supply line 26 which are coupled to said valve and wherein on rotation of the handle from a closed position about said vertical axis in a first sense to a first open position causes delivery of chilled water to said outlet means and, on rotation of the handle about said vertical axis in a second sense, opposite to the first sense to a second open position, together with operation of the security button from a locked position enables rotation of the handle about said horizontal axis whereby water from said cold water supply line is delivered to a boiler unit (16) which in use causes boiling (or near boiling water) to be delivered to said outlet means.
4. A tap as claimed in claim 3 wherein the valve includes first co-operating valve elements (52,158,168) which open when the handle is moved to said first open position, and second co-operating valve elements (52,144,170) which are aligned when the handle is moved to said second open position.
5. A tap as claimed in claim 4 wherein the valve includes third co-operating valve elements (135,190) which are opened by rotation of the handle about said horizontal axis from an off position when the handle is in said second open position whereby, in use, water from said cold water supply line passes through said second and third co-operating

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valve elements to said boiler unit.

6. A tap as claimed in claim 5 wherein the valve includes a base plate (50) including first, second, third and fourth ports (140, 142, 144 and 146) therein and wherein said chilled water supply line (24) is coupled to the first port (140), said cold water supply line (26) is coupled to the second port (142), a cold water delivery line (30) is coupled to said third port (144), and a chilled water delivery line (28) is coupled to the fourth port (14).

7. A tap as claimed in claim 6 wherein valve includes a valve disc (52) which sealingly engages a valve face (153) of the base plate (50) and wherein the valve disc is mounted for rotation with the handle about said vertical axis.

8. A tap as claimed in claim 7 wherein the first co-operating valve elements include said valve disc and a ceramic insert (158) and wherein the valve face includes a recess (156) within which is located said ceramic insert (158), the insert including first and second bores (160,162) which communicate with said first and said fourth ports respectively and wherein the valve disc includes a recess (168) which provides fluid communication between said first and second bores when the handle is in its first open position.

20

9. A tap as claimed in claim 7 or 8 wherein the second co-operating valve elements include said valve disc and said third port (144) which opens to said face and wherein the valve disc includes a valve disc bore (170) which is aligned with said third port (144) when the handle is in said second open position.

25

10. A tap as claimed in claim 7, 8 or 9 wherein the third co-operating valve elements include a spigot (134) formed with said base plate and having a spigot bore (135) therethrough and a resilient valve element (190), the arrangement being such that said spigot bore (135) is in fluid communication with said second port and said resilient valve element is biased into sealing engagement with the spigot to close said spigot bore unless the handle is rotated about said horizontal axis.

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11. A tap as claimed in claim 10 wherein the valve includes movable body portions (172,174) which together with said valve base plate define a valve chamber (60) within which the valve disc and hollow spigot are located.

5

12. A tap as claimed in claim 11 wherein the valve includes a diaphragm (176) which extends across said valve chamber and carries said resilient valve element (190).

13. A tap as claimed in claim 12 wherein the valve includes a plunger (58) the lower 10 end (234) of which is coupled to the diaphragm and wherein the upper end of the plunger is pivotally connected to said handle, the arrangement being such that on rotation of the handle about said horizontal axis from said off position, the plunger is raised thereby unseating the resilient valve element from the spigot bore thereby enabling cold water from the cold water supply line to pass through the spigot bore, through the valve chamber, 15 through the disc bore and through the third port.

14. A tap as claimed in claim 12 or 13 wherein the diaphragm is clamped between said movable body portions.

20 15. A tap as claimed in claim 11, 12, 13 or 14 wherein the movable body portions are mounted for rotation with the handle about said vertical axis.

16. A tap as claimed in claim 15 wherein an upper one (172) of said movable body 25 portions is formed with pivot shafts (216) which are coupled to the handle (12) by means of a locking member (220) to thereby form a pivotal connection which permits rotation of said handle about said horizontal axis and rotation of the movable body portions (172,174) with the handle about said vertical axis.

17. A tap as claimed in any one of claims 3 to 16 wherein the security button is 30 mounted for reciprocating movement in a button opening (106) in the handle.

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18. A tap as claimed in claim 19 wherein a compression spring (114) biases the button to locked position which prevents rotation of the handle about said horizontal axis.

19. A tap as claimed in claim 18 wherein the body is formed with a cam member (80) 5 which co-operates with an interlocking projection (120) on said security button.

20. A tap as claimed in claim 19 wherein said cam member is formed adjacent to said first part spherical bearing surface and tapers in width, the arrangement being such that when the handle is in said closed position the cam engages said interlocking projection 10 (120) and prevents rotation of the handle from said off position about said horizontal axis whether or not the security button is moved from its locked position but, when the handle is rotated to said second open position and the security button is pressed inwardly to an unlocked position, the interlocking projection disengages said cam whereby the handle can be rotated from said off position about said horizontal axis.

15

21. A dispensing system for dispensing chilled water and boiling (or nearly boiling) water, said system including a tap as defined in any one of claims 3 to 20, and a boiler unit (16) having an input which is coupled to said cold water supply line and an outlet (20) which is coupled by means of a boiling water line (32) to said outlet means.

20

22. A system as claimed in claim 21 wherein the boiler unit (16) includes a vent outlet (22) which is coupled to said outlet means (8,10) by means of a vent line (34).

23. A dual valve (14) having a pair of valve elements (52,158) which are mounted for 25 rotation relative to one another and wherein one of the valve elements includes an inlet port (160) and an outlet port (162) and the other of the valve elements includes a recess (168), the arrangement being such that when the valve elements are rotated so that the recess overlies, at least in part, both of said ports, fluid can flow into one of the ports through the recess and out of the other port.

30

- 20 -

24. A tap (4) having a handle (12) which is mounted for biaxial rotation, the tap including a valve assembly (14) which includes a plunger (58) and means (240) for coupling the plunger to the handle so that the plunger rotates with the handle about one axis (40) but is unseated from a valve seat (134) when the handle is rotated about an orthogonal axis (44).

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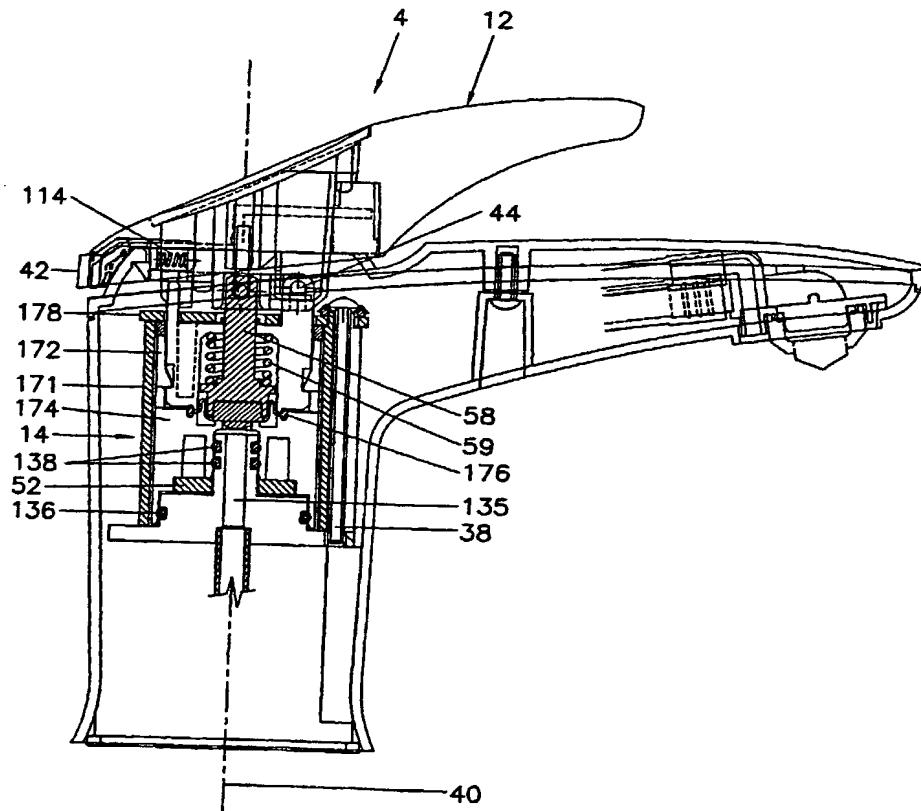
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[Continued on next page]

(54) Title: TAP



(57) Abstract: A tap (4) including a tap body (6) within which is located a valve (14), an operating handle (12) mounted on the body and coupled to the valve, a security button (42) which is interlocked with the handle and/or valve, the arrangement being such that the valve can only be opened after activation of the security button.

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NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,
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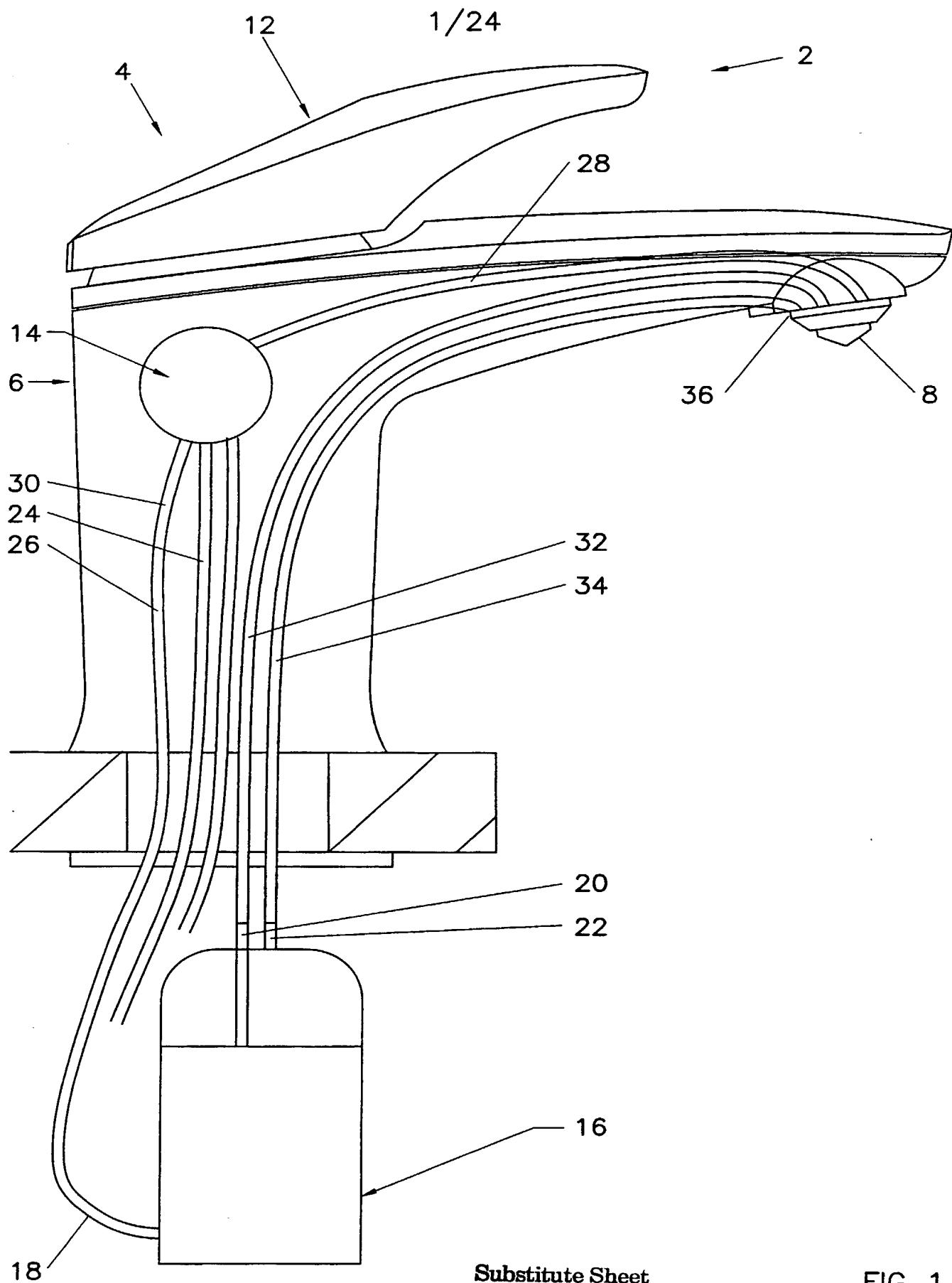
— With international search report.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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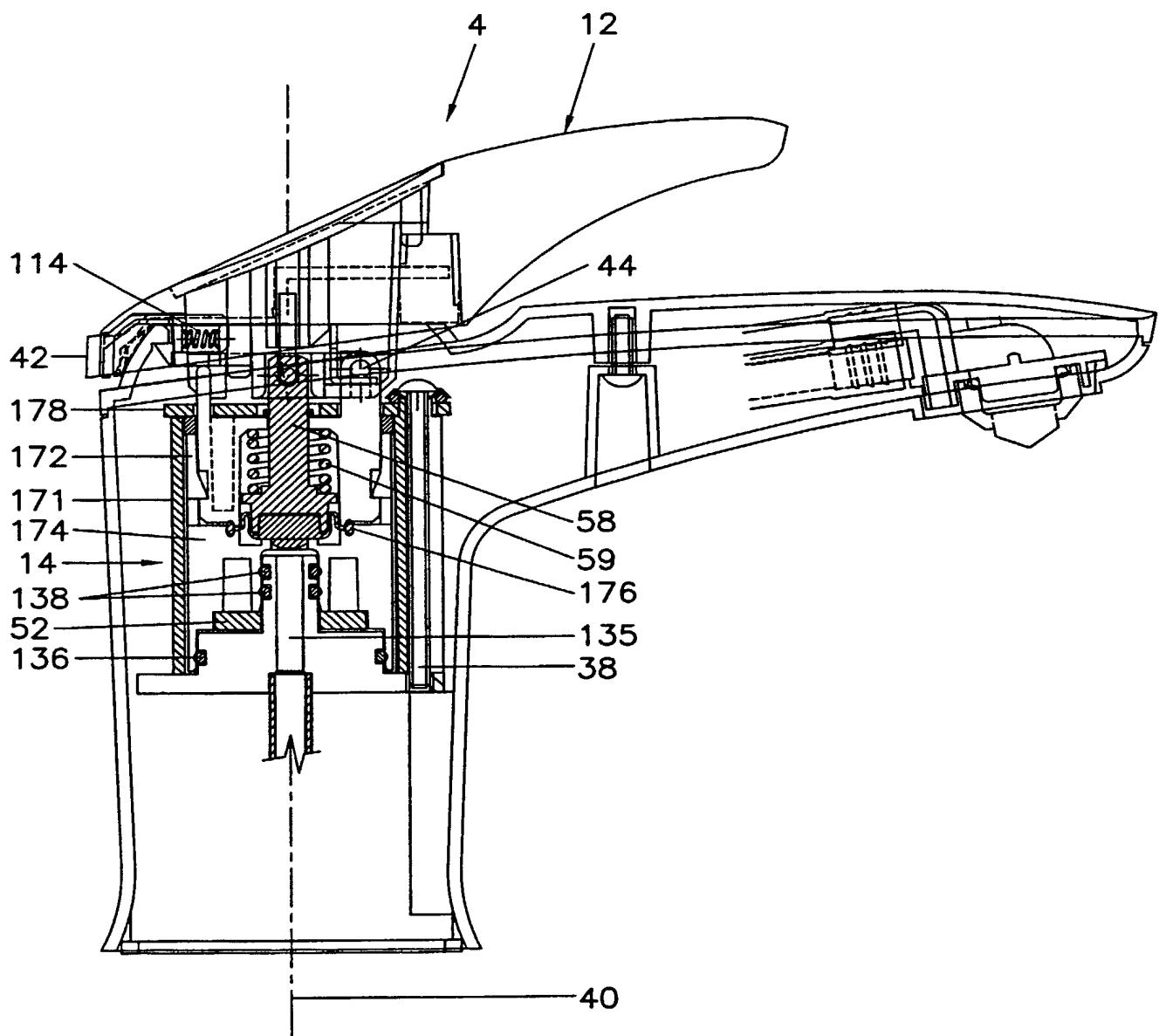
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Substitute Sheet
(Rule 26) RO/AU

FIG 1

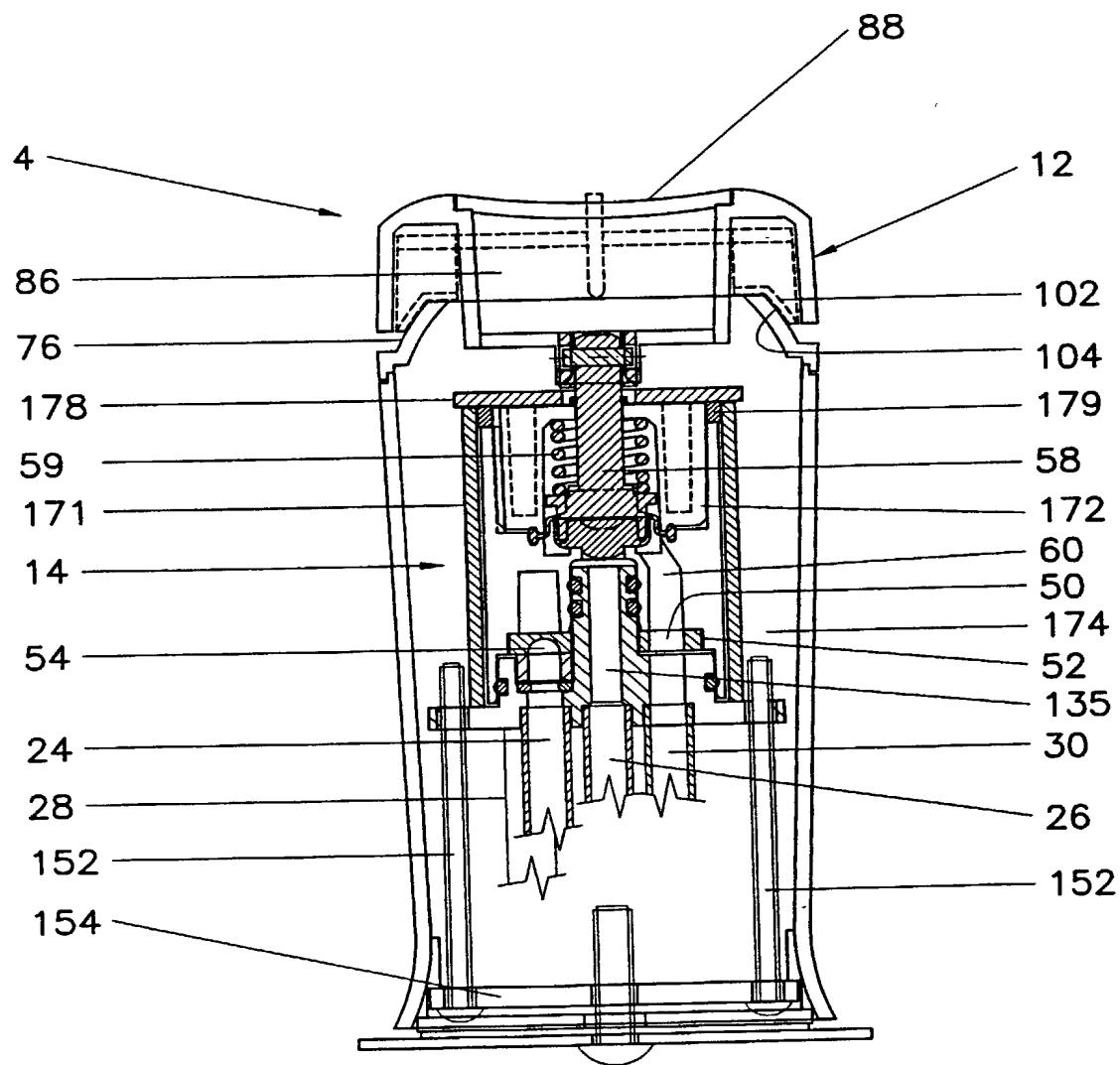
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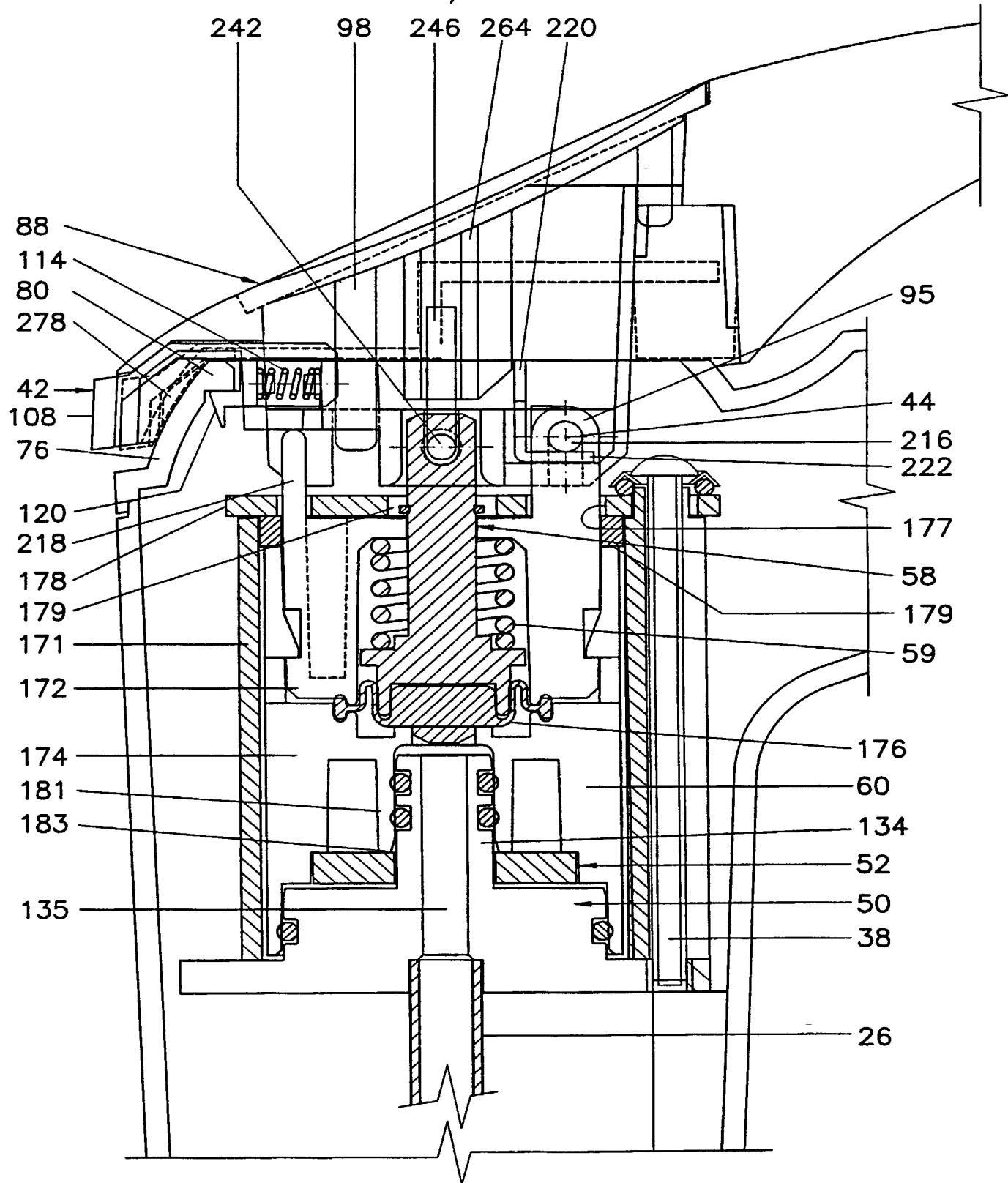


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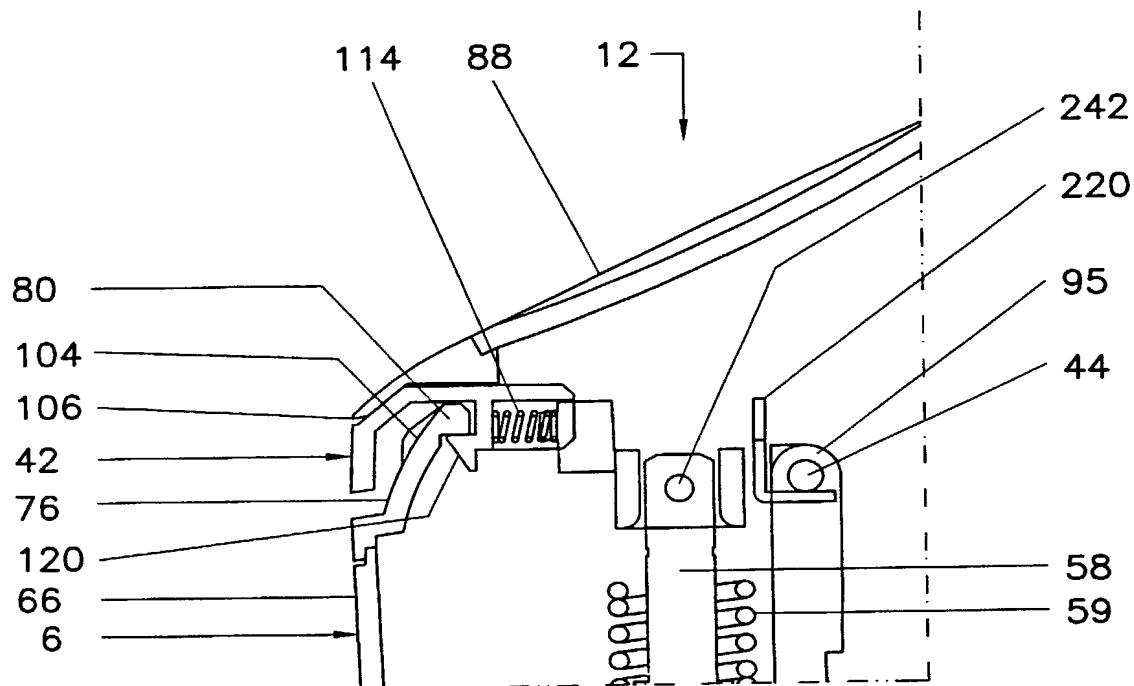


FIG 5A

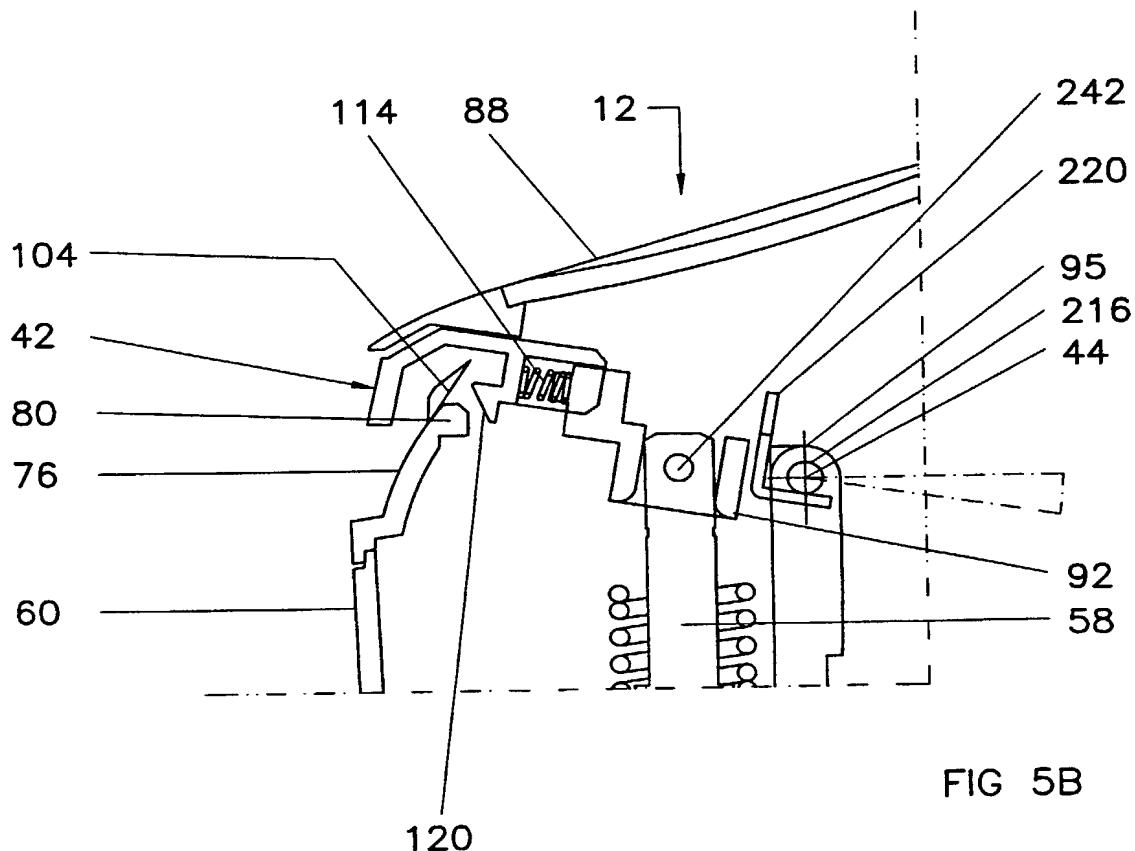


FIG 5B

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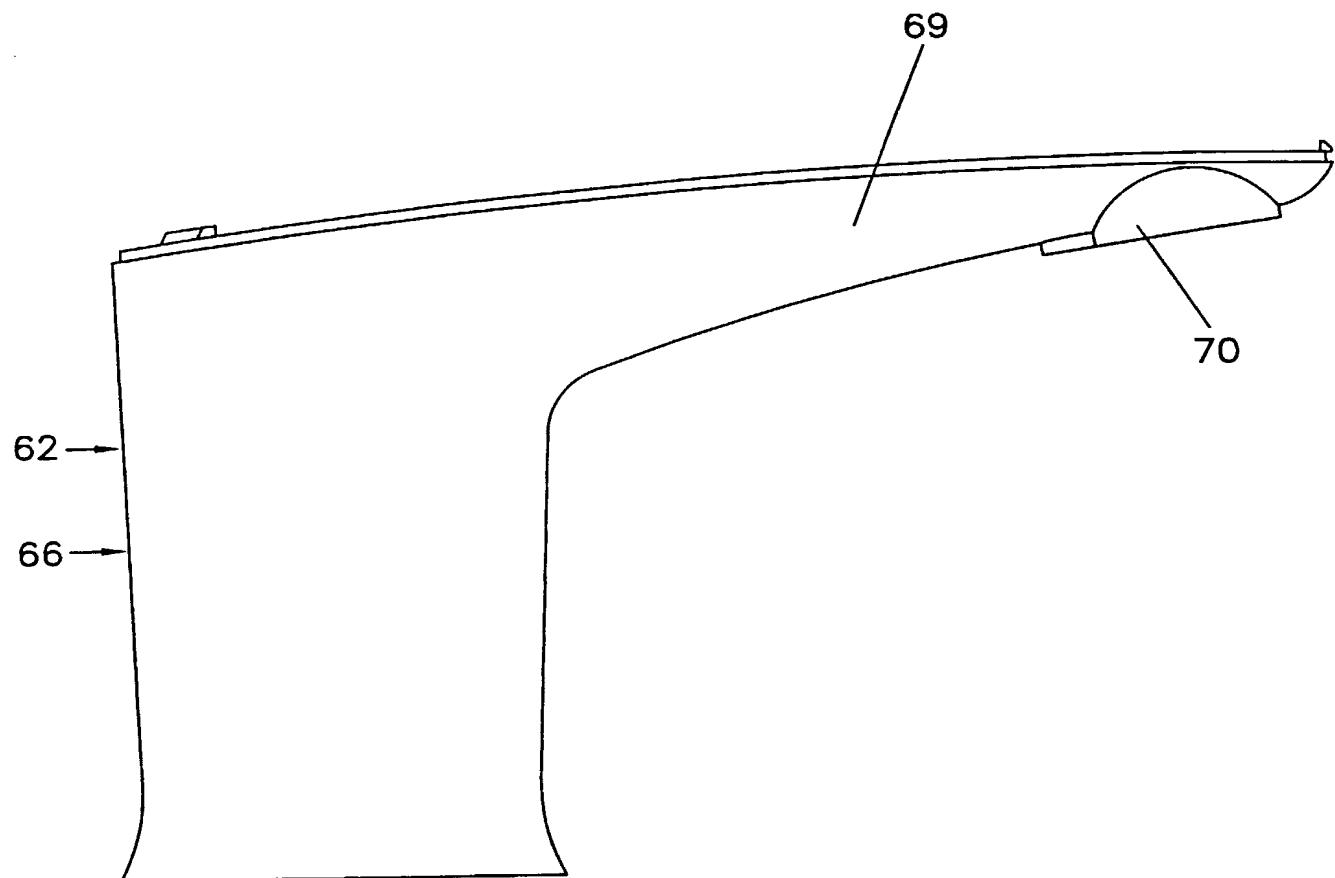


FIG 6

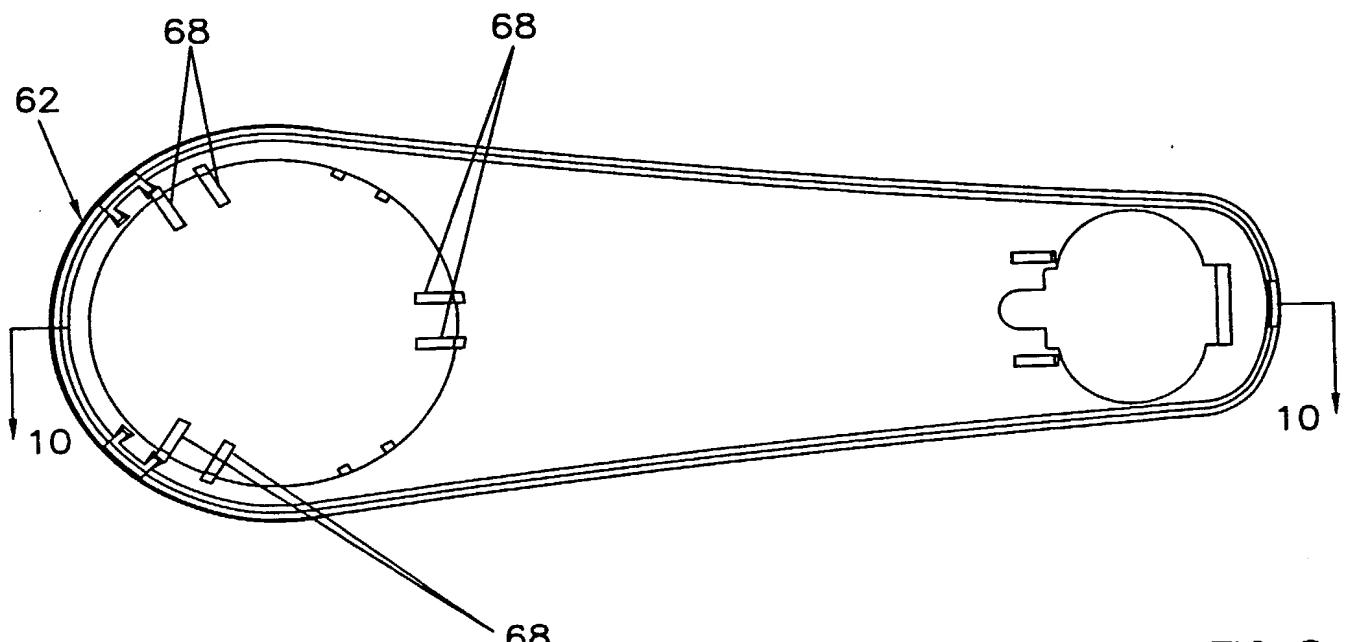


FIG 8

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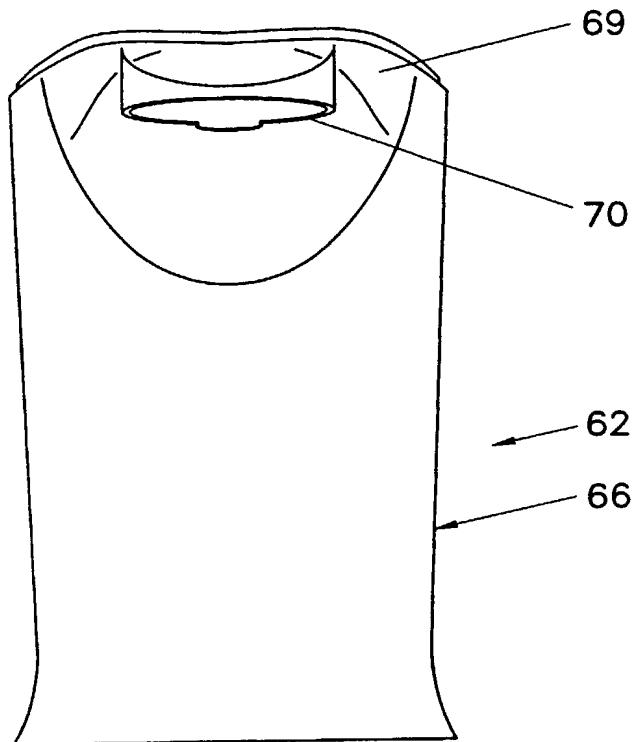


FIG 7

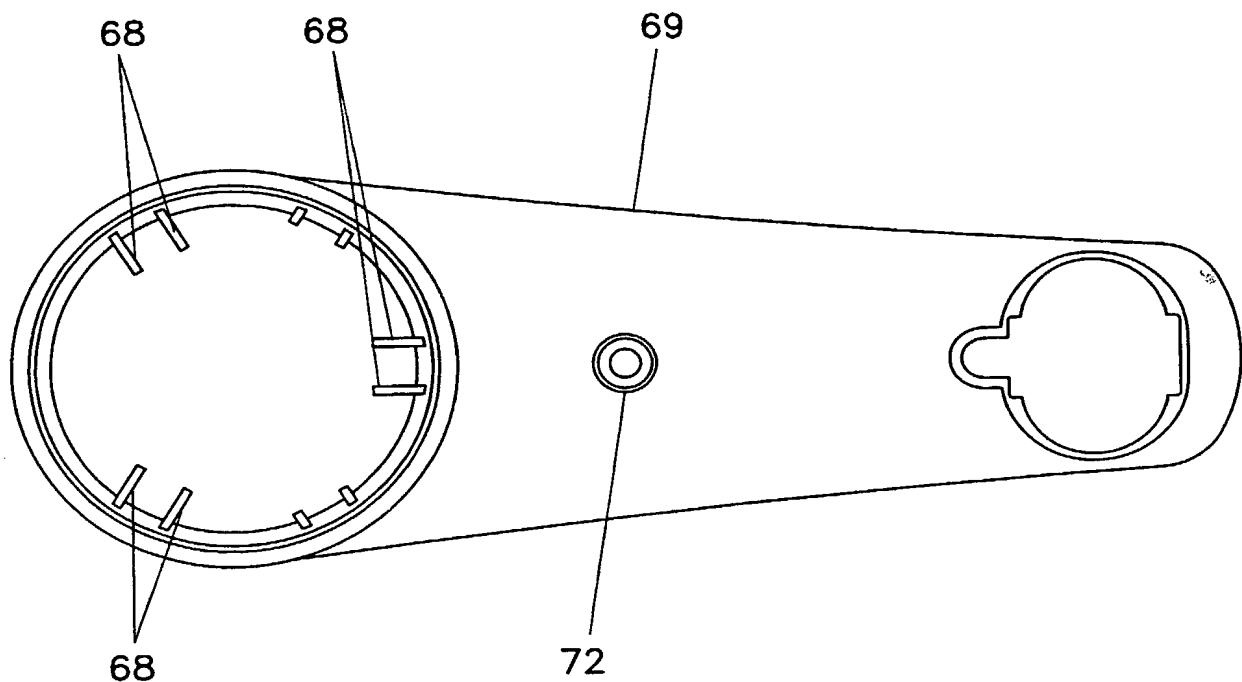
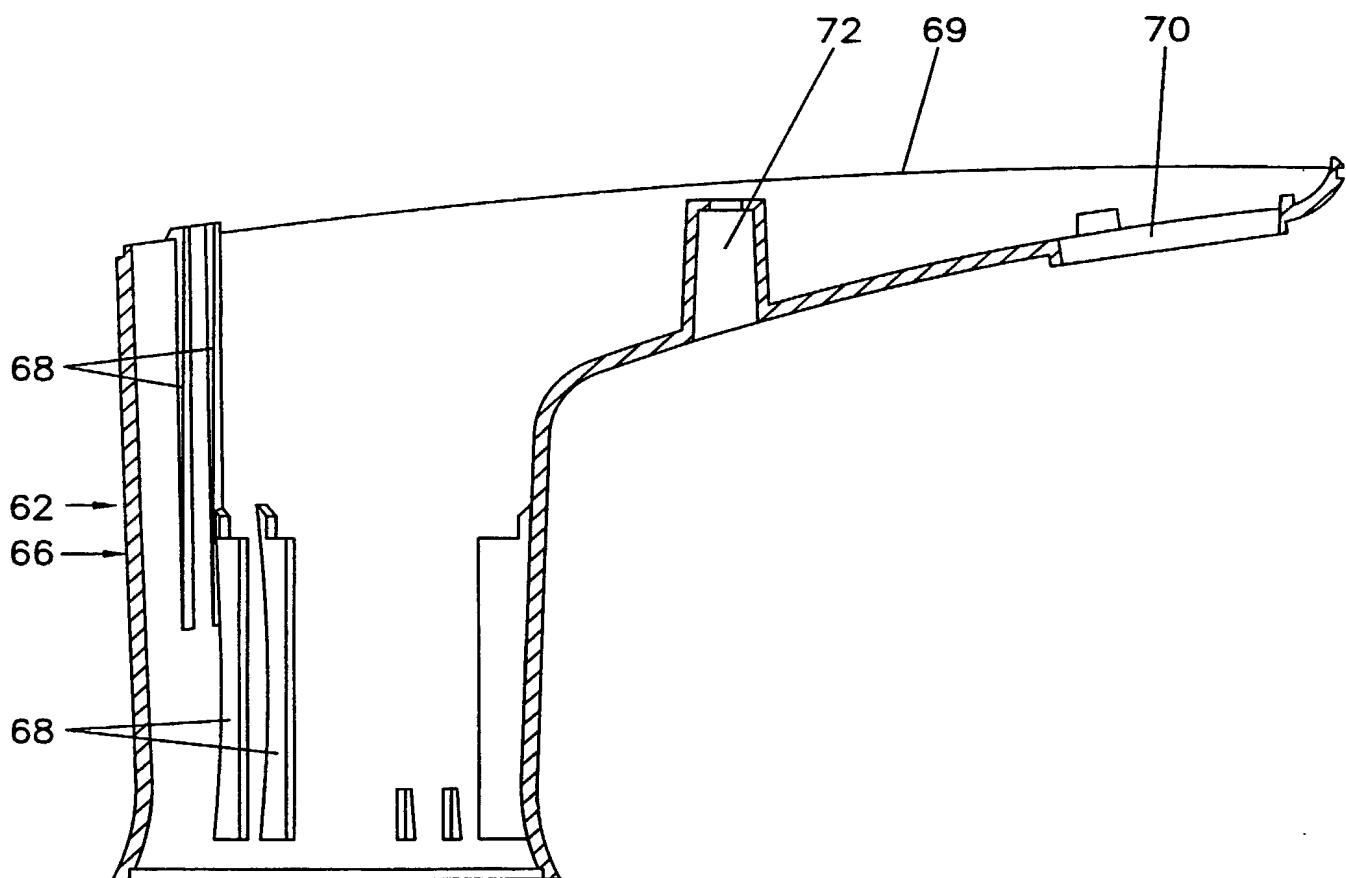


FIG 9

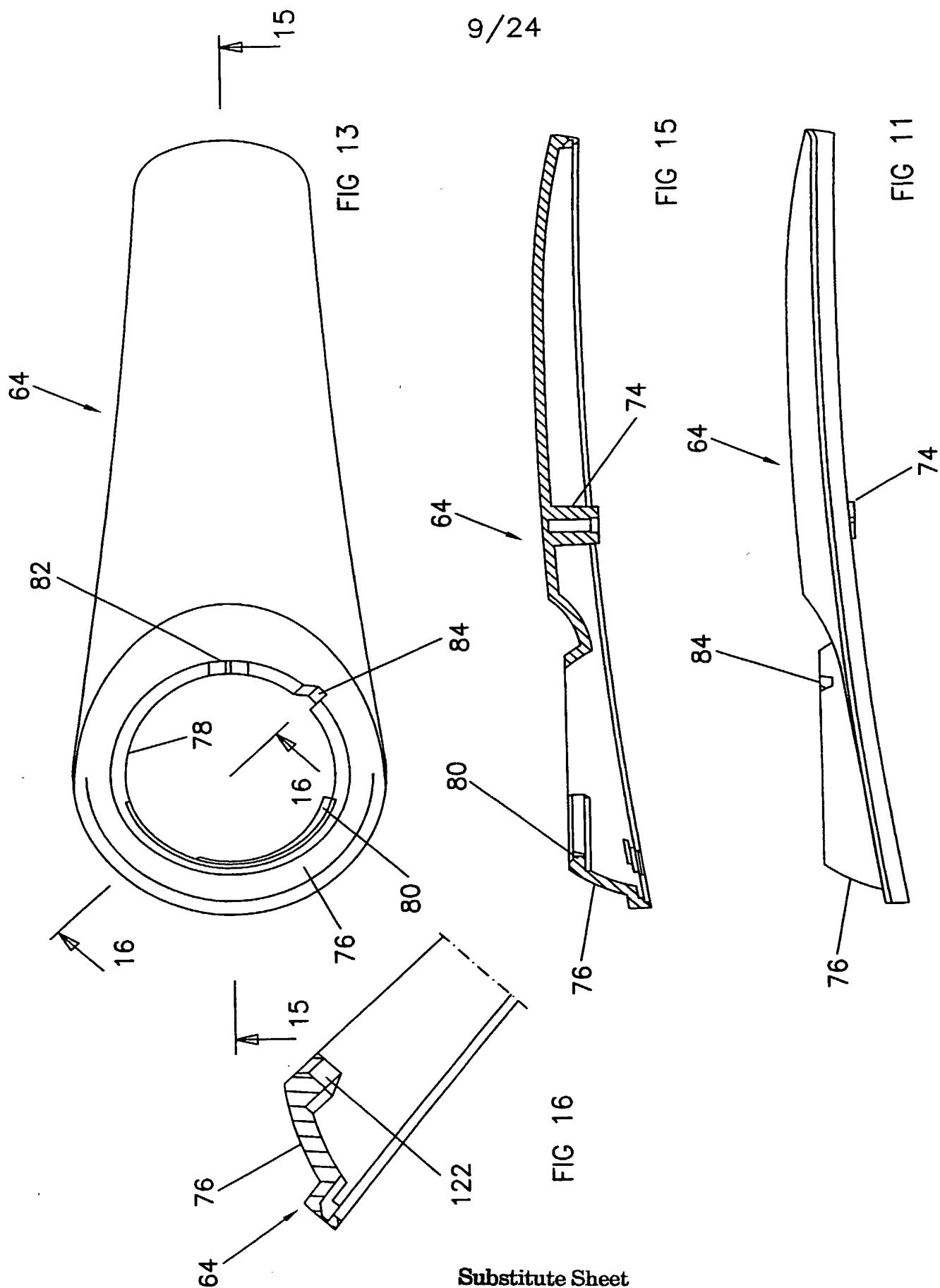
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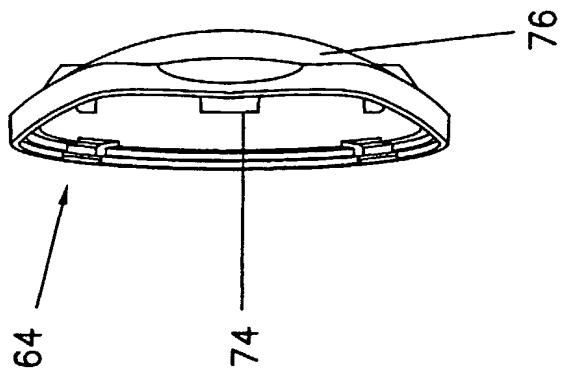


FIG 12

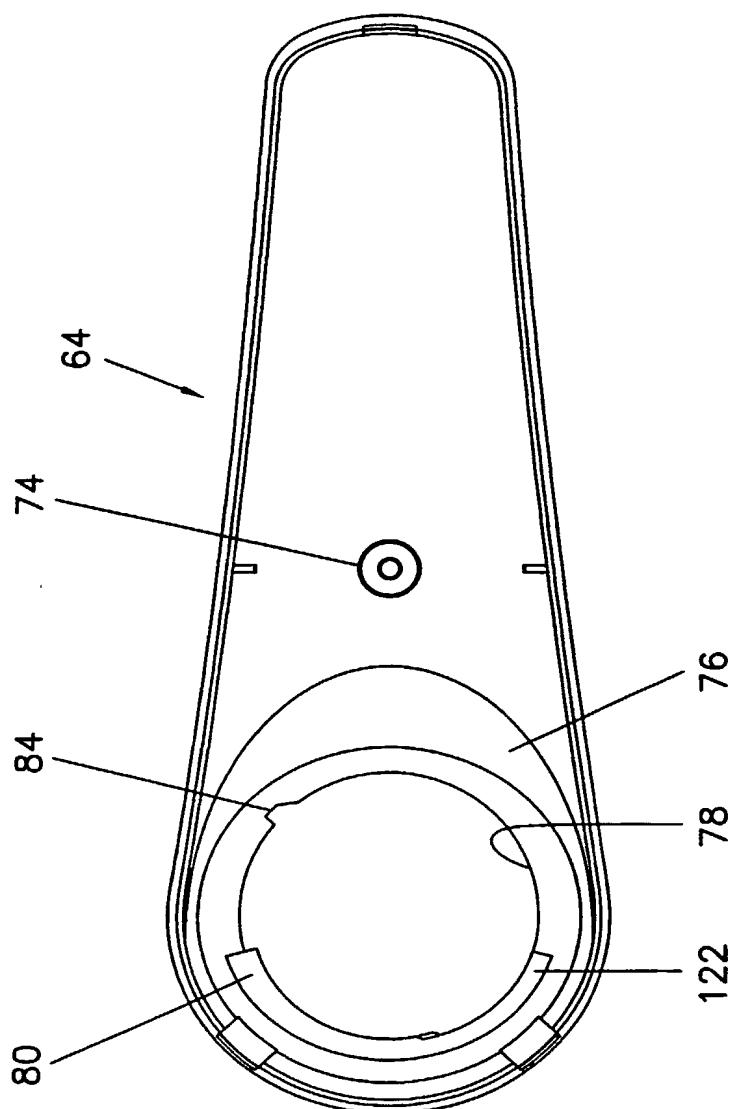


FIG 14

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94 246 91 12 90 262

22

22

FIG 20

96 94 92

23 91 262

113 86 87 246

96

106

85

250

94

92

93

90

100 12

FIG 22

12

FIG 21

250 250

250 89

FIG 17

250 94

100 106

250

106

250

94

246

83 90 95

FIG 19

Substitute Sheet
(Rule 26) RO/AU

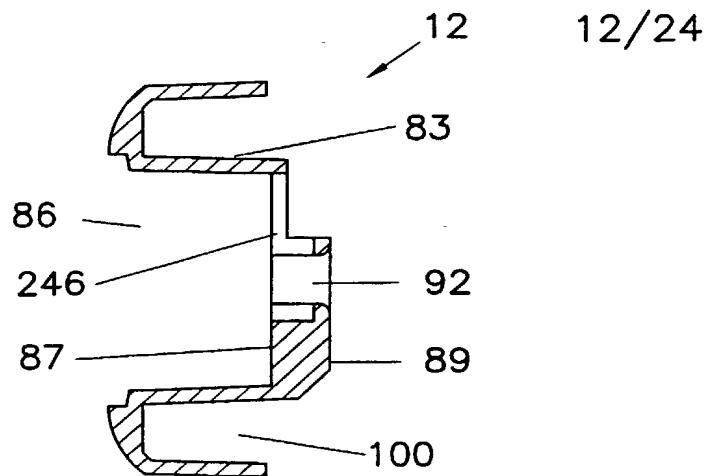


FIG. 23

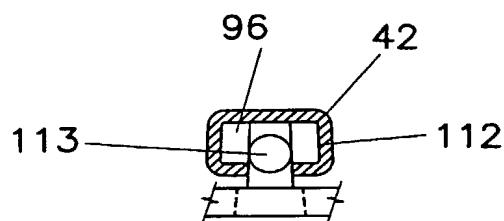


FIG. 24

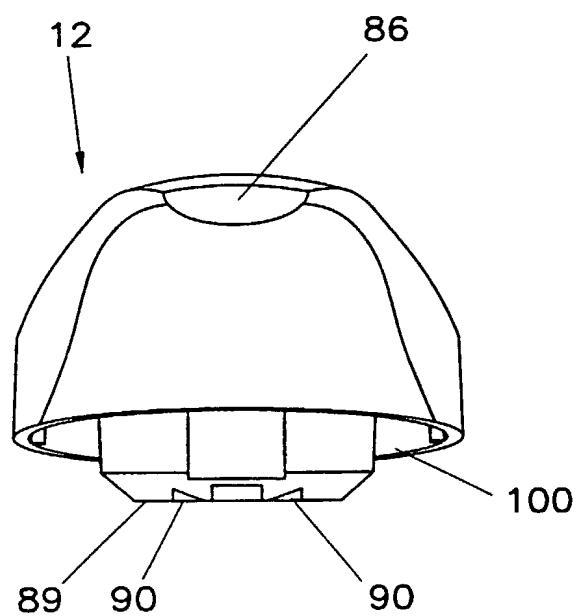
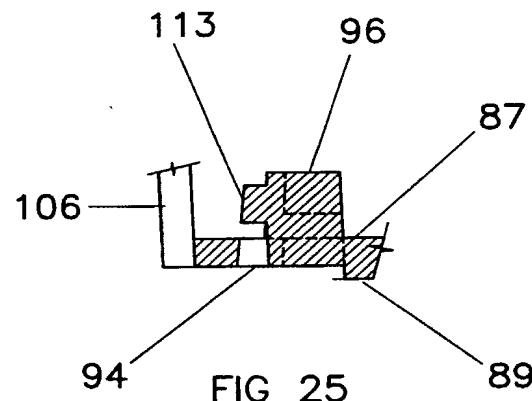
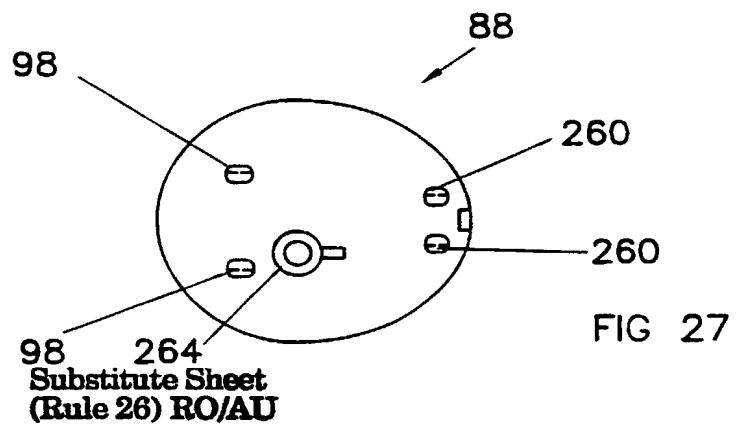
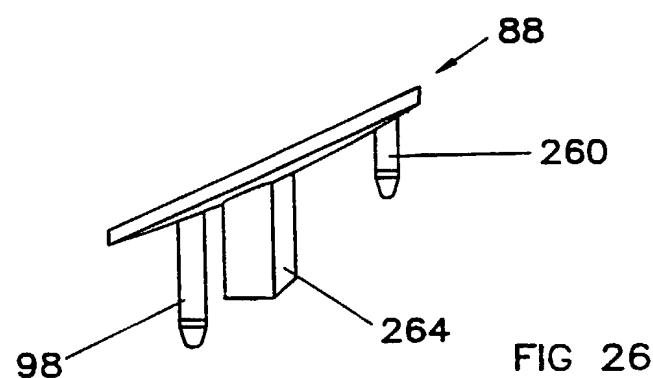
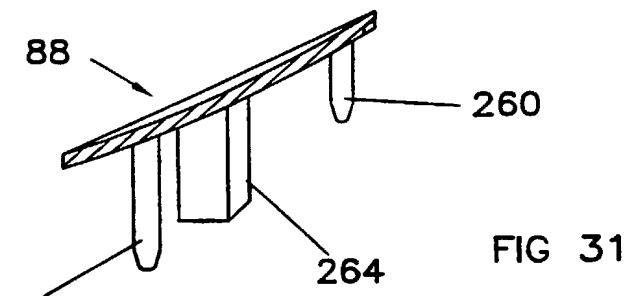
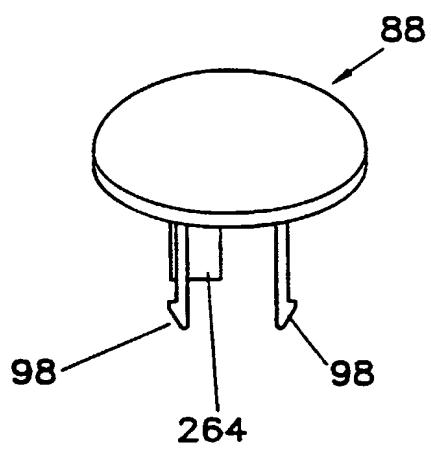
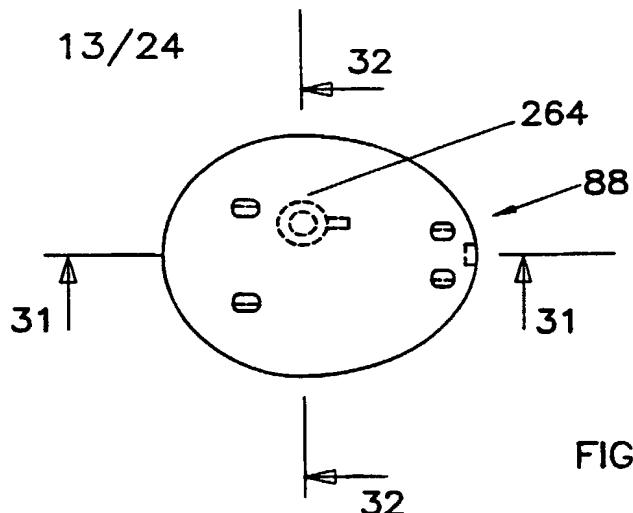
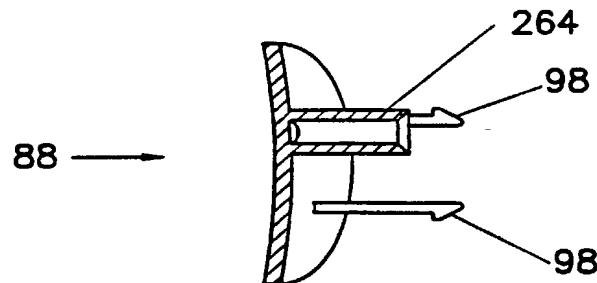


FIG. 18



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SECTION B:B

FIG 32

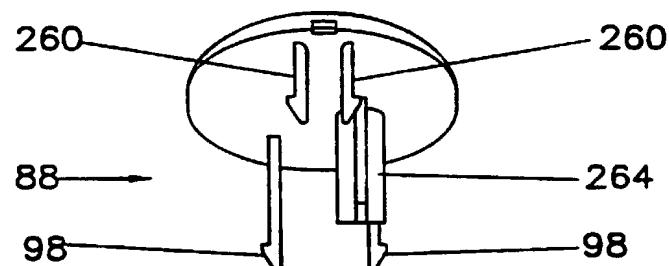


FIG 30

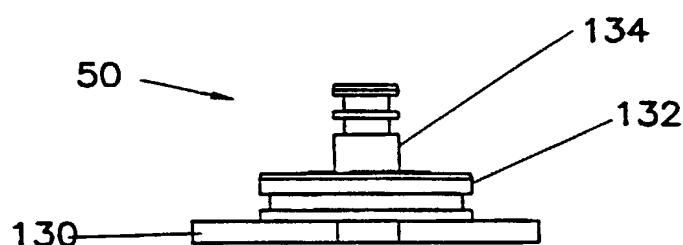


FIG 33

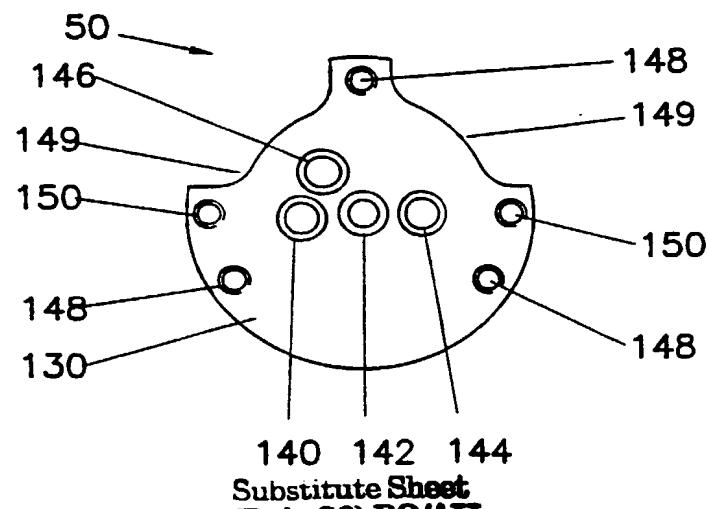


FIG 34

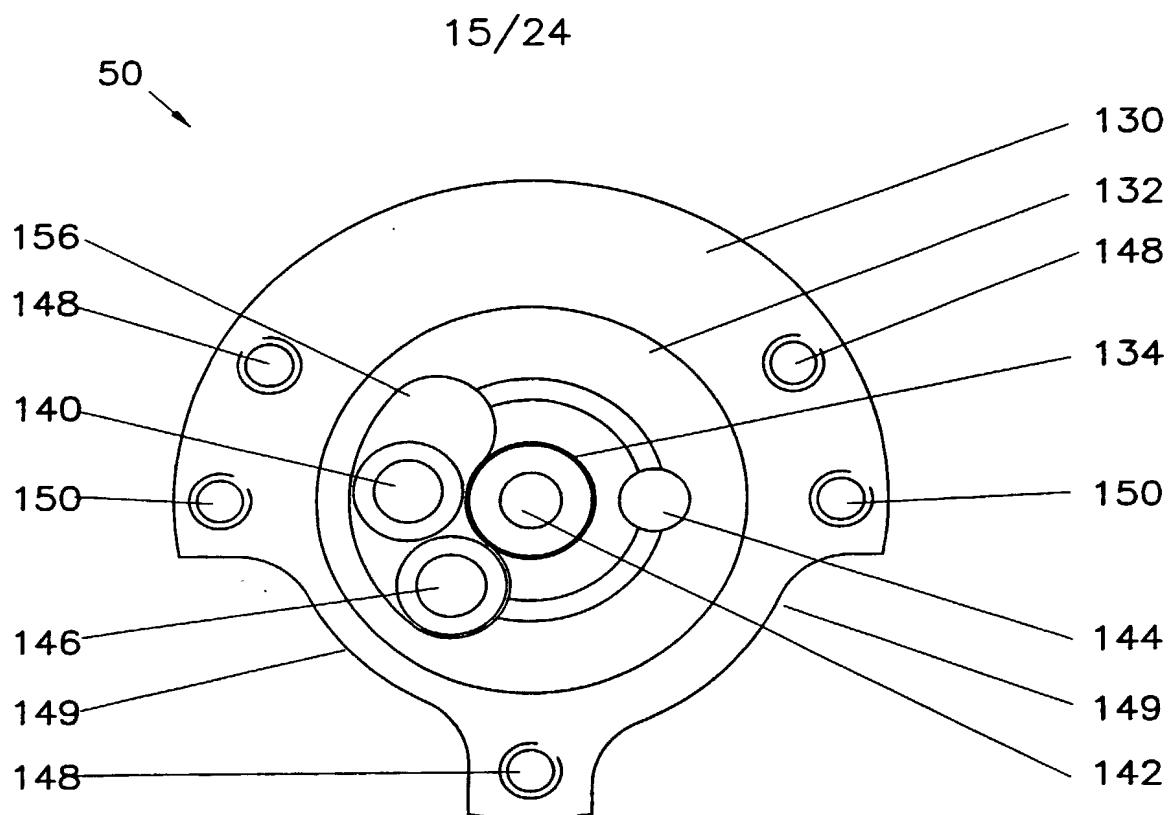


FIG 35

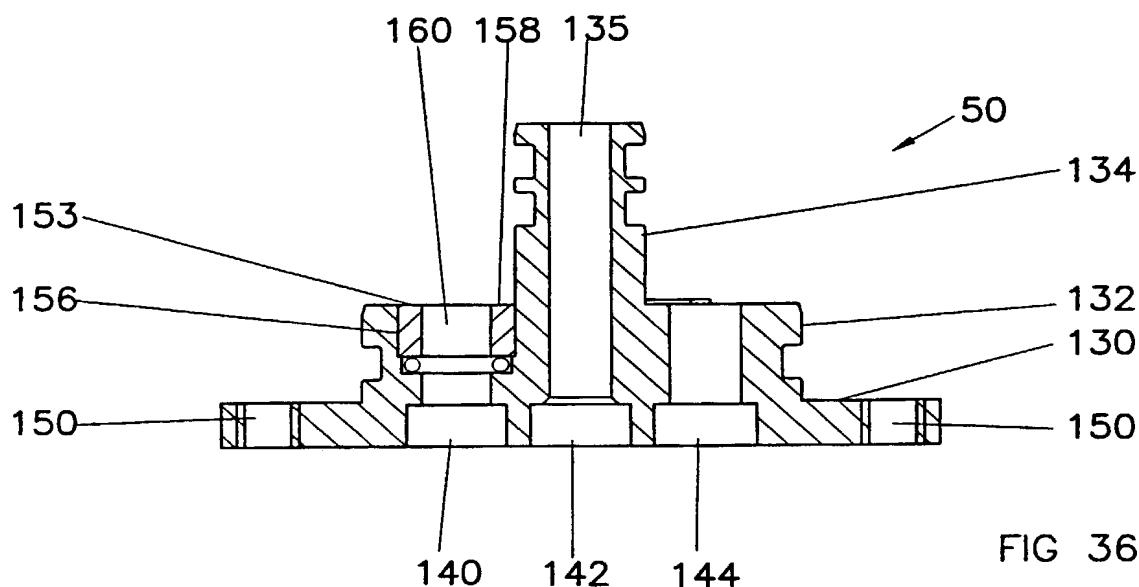


FIG 36

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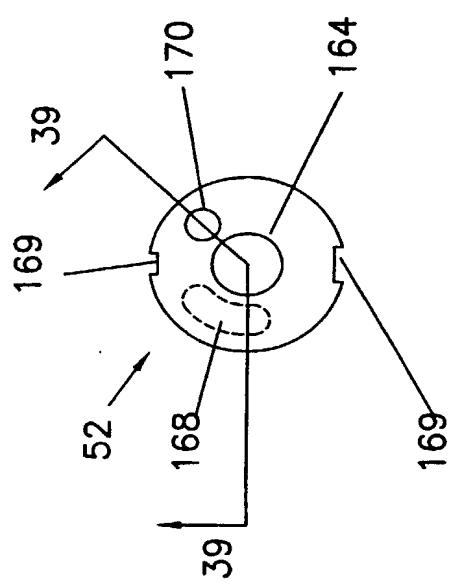


FIG 38

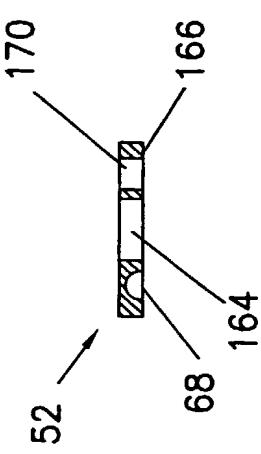


FIG 39

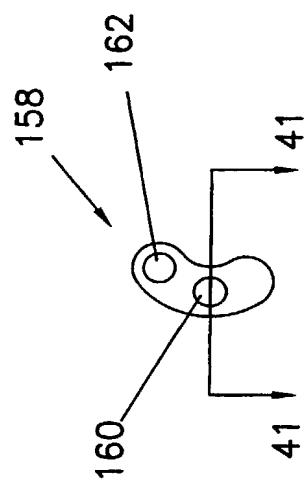


FIG 40

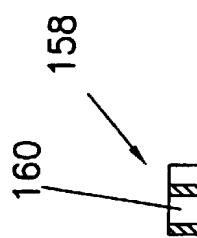


FIG 41

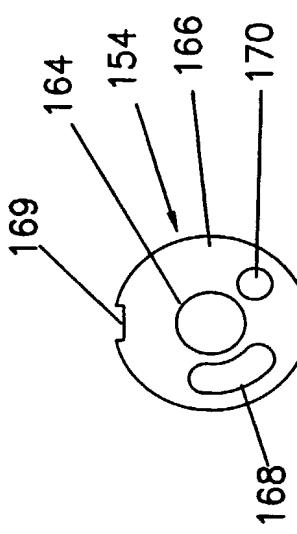


FIG 37

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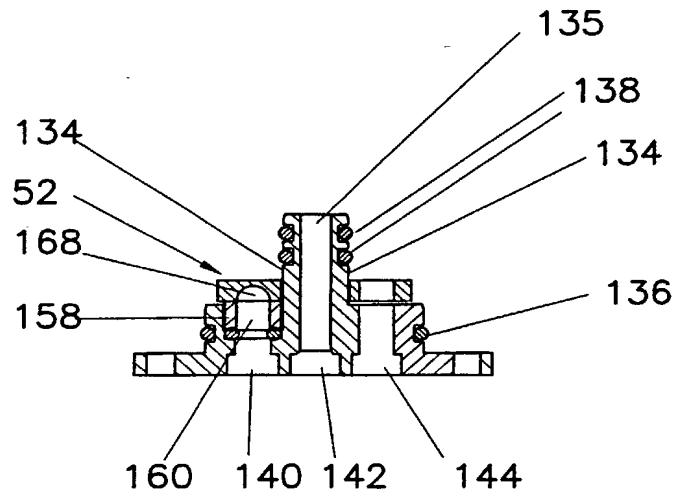


FIG 42

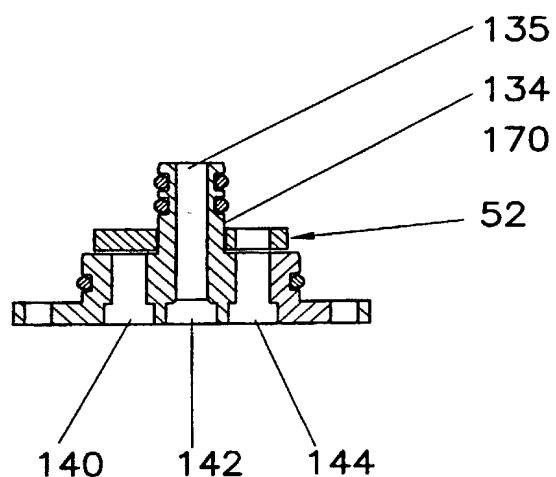


FIG 43

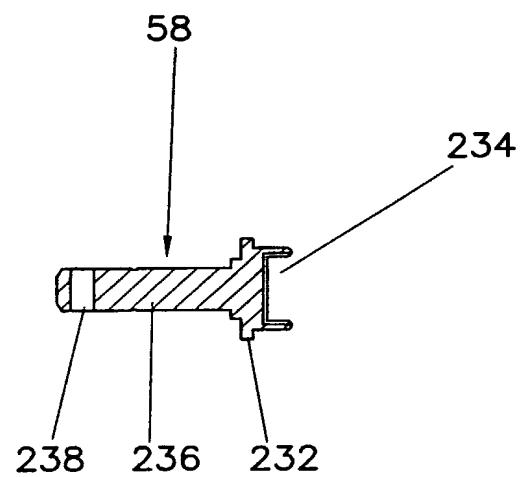


FIG 48

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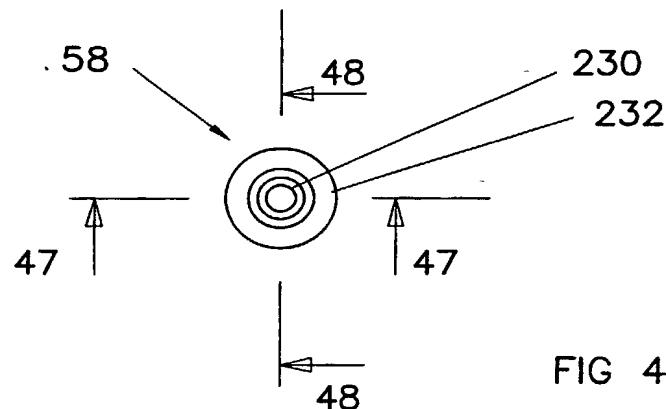


FIG 46

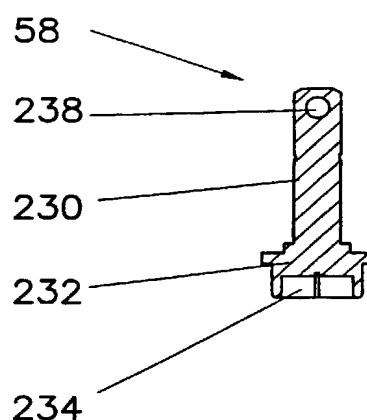


FIG 47

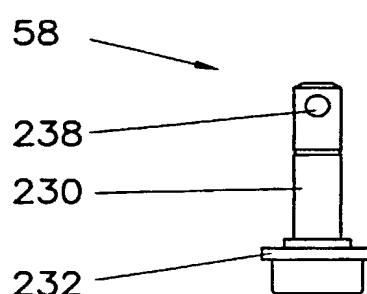


FIG 44

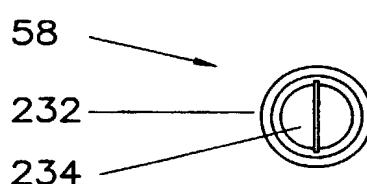


FIG 45

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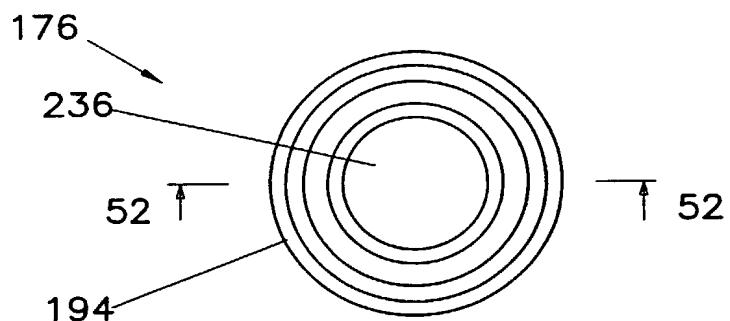


FIG 51

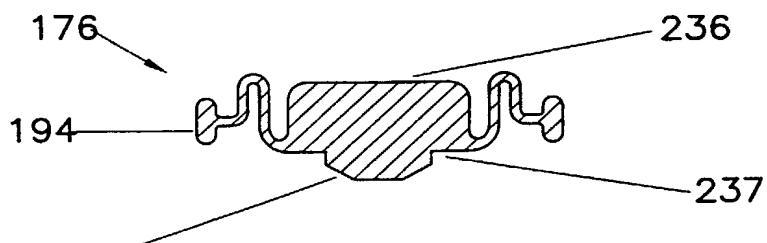


FIG 52

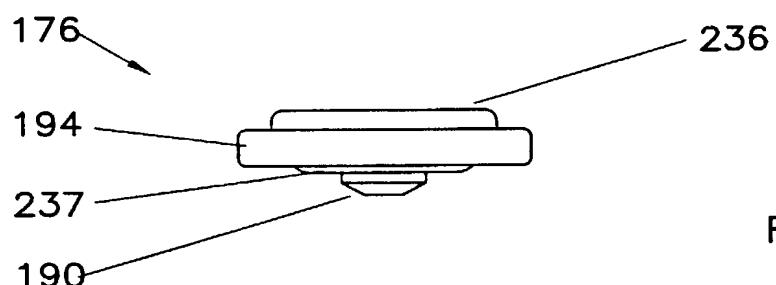


FIG 49

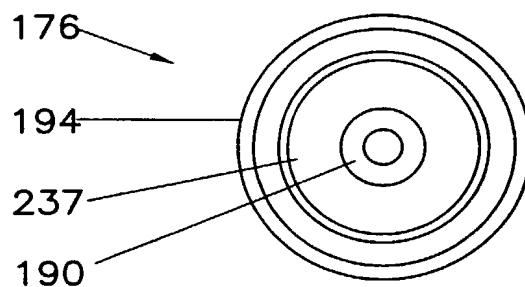
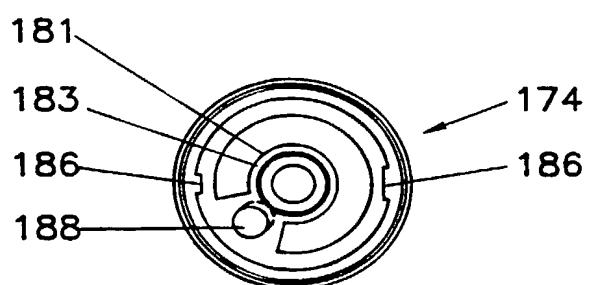
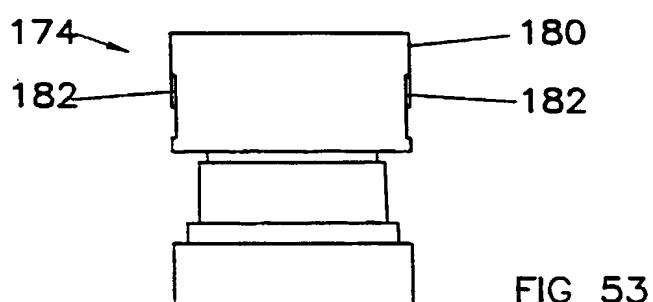
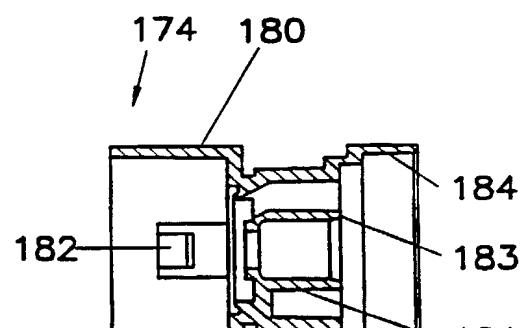
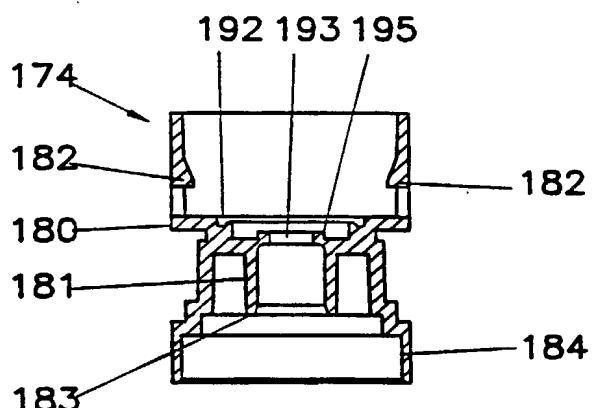
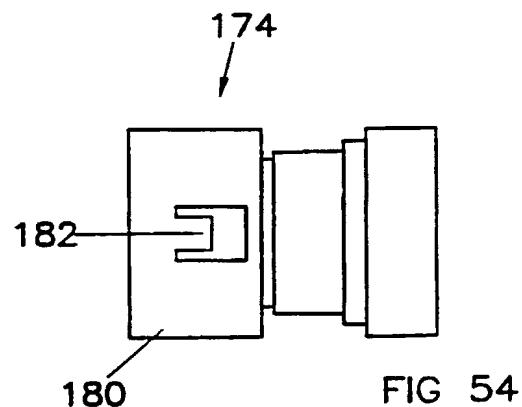
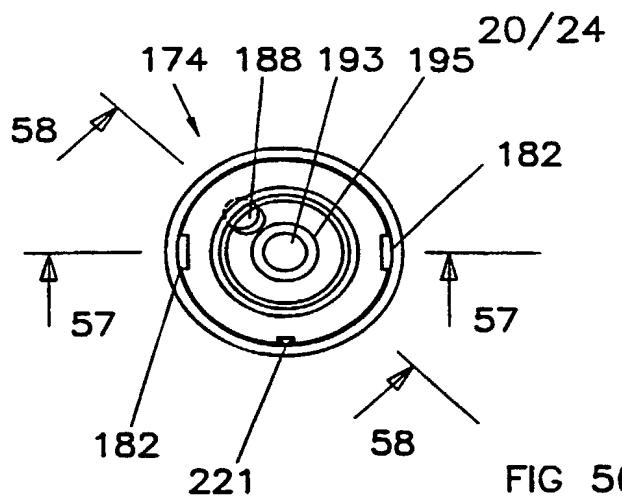
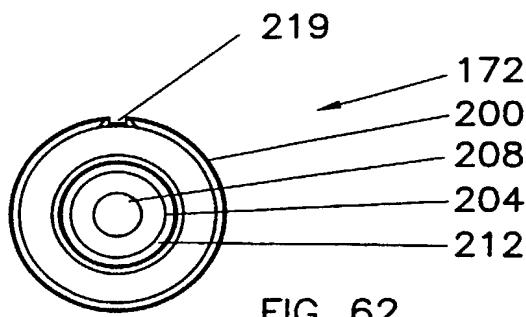
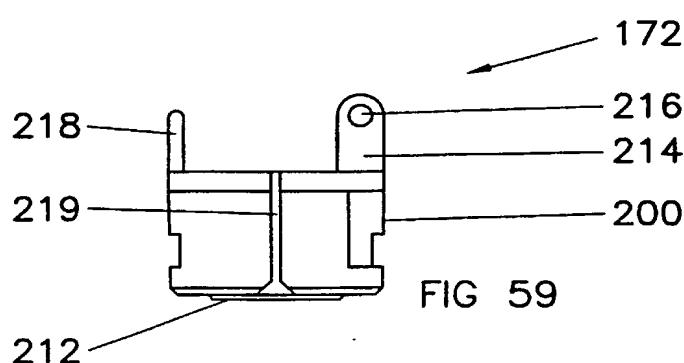
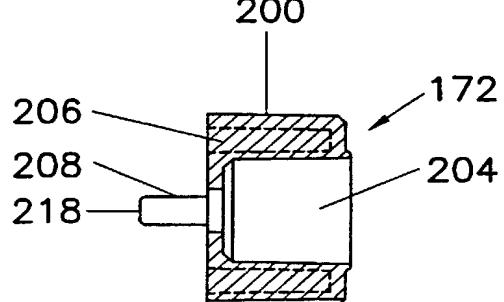
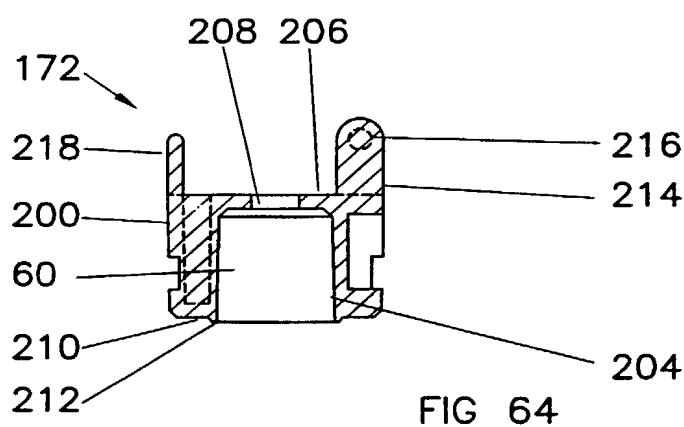
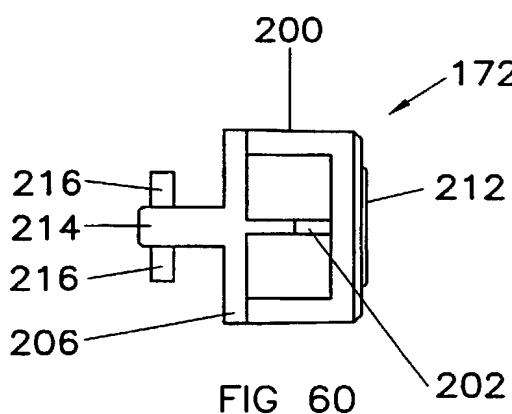
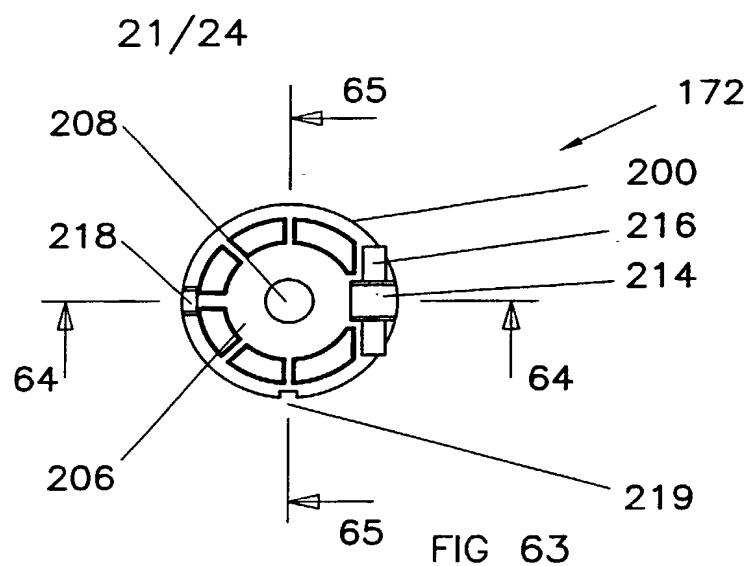
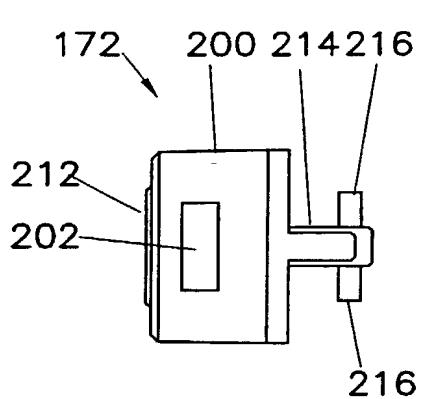


FIG 50



Substitute Sheet
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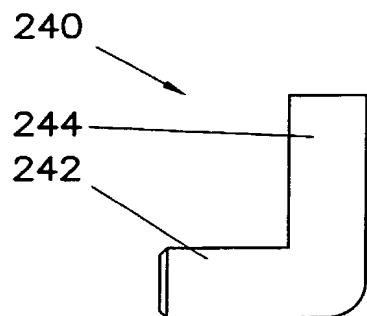


FIG 77

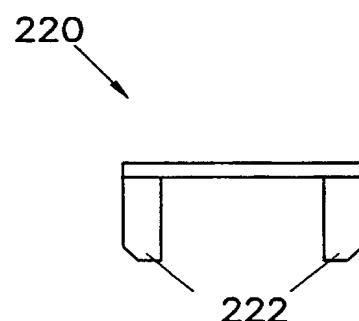


FIG 80

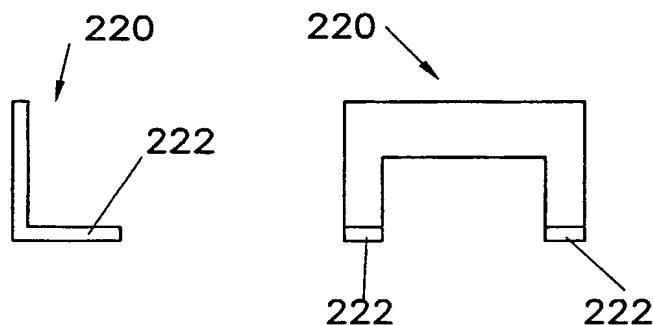
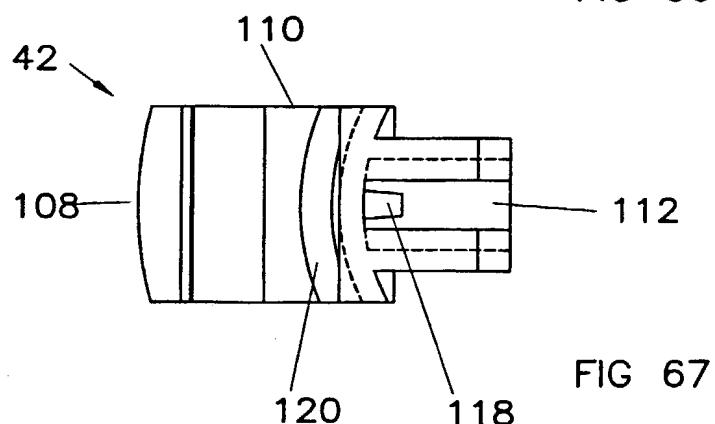
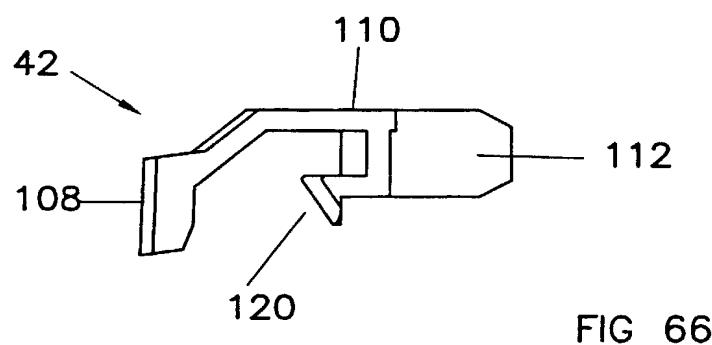
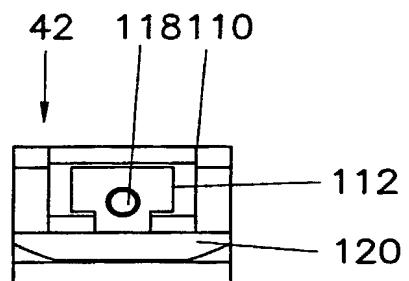
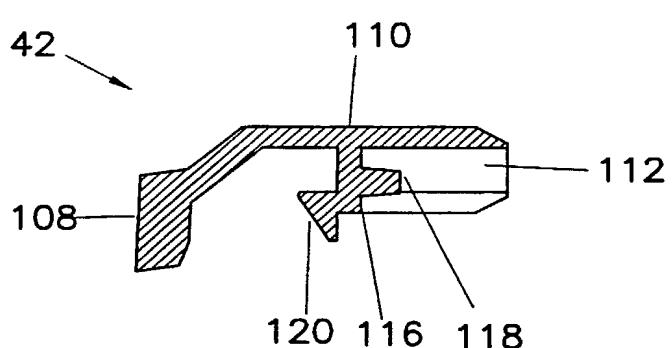
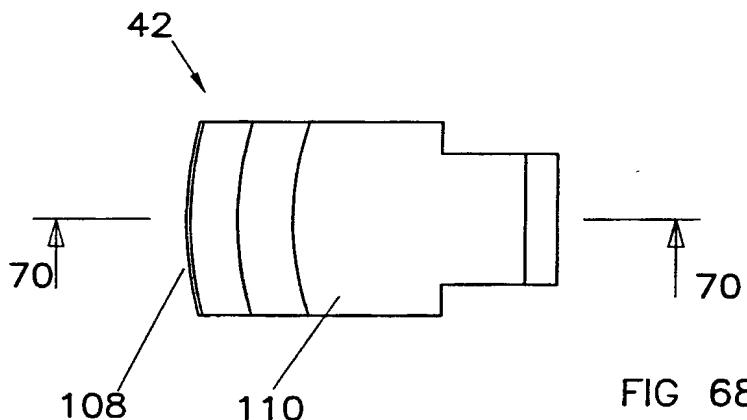


FIG 78

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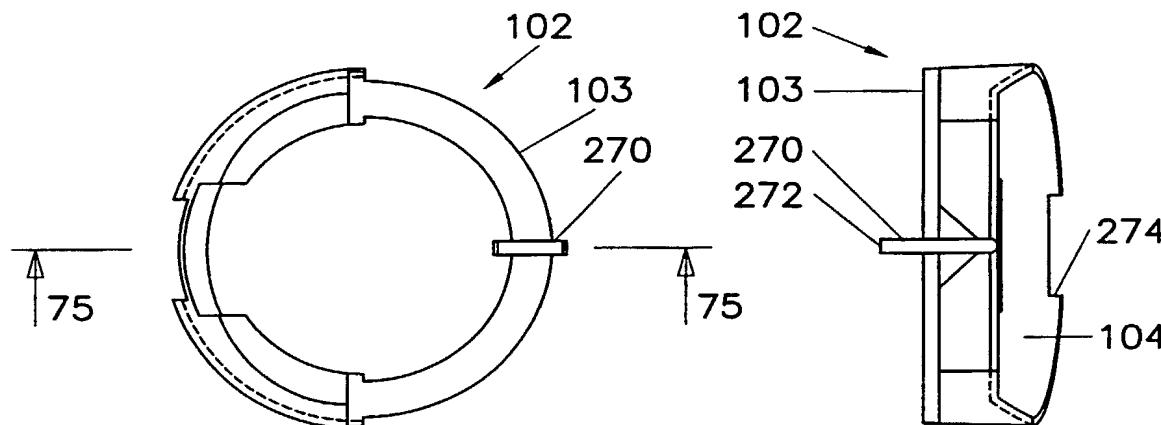


FIG 73

FIG 74

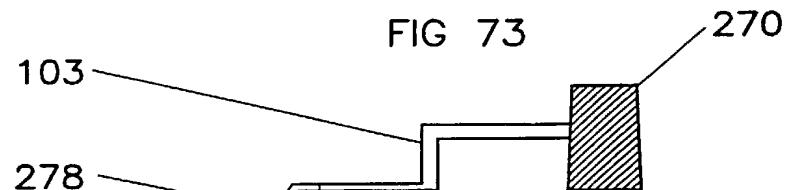


FIG 75

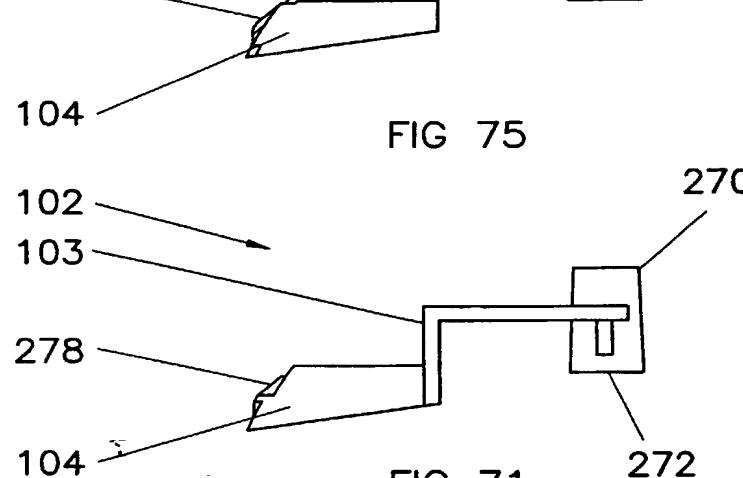


FIG 71

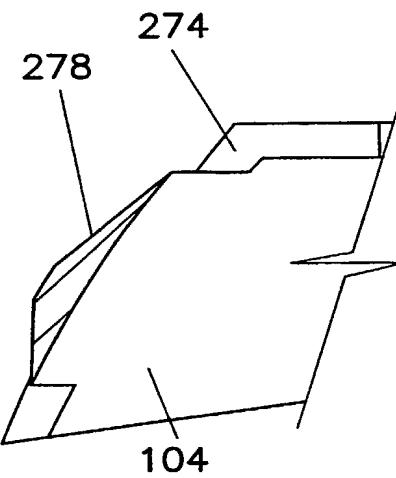
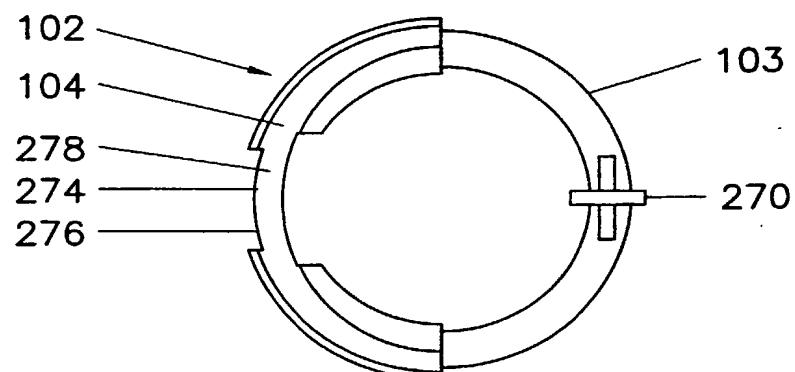


FIG 76

FIG 72
Substitute Sheet
(Rule 26) RO/AU

Our Ref.: 17480, P023DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that

My residence, post office address and citizenship are as stated below, next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Tap

the specification of which

is attached hereto.

was filed on _____ as

Application Serial No. _____

and was amended on _____

(if applicable)

International Patent Application No. PCT/AU00/01079 filed 8 September 2000

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, and that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119, of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

<u>Prior Foreign Application(s)</u>	<u>Priority Claimed</u>
<u>PQ2703/99</u> (Number)	<u>Australia</u> (Country) <u>8 September 1999</u> (Day/Month/Year Filed) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<u>PCT/AU00/01079</u> (Number)	<u>PCT</u> (Country) <u>8 September 2000</u> (Day/Month/Year Filed) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status - patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status - patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status - patented, pending, abandoned)

I hereby appoint BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP, a firm including: William E. Alford, Reg. No. 37,764; Farzad E. Amini, Reg. No. 42,261; Aloysisus T. C. AuYeung, Reg. No. 35,432; William Thomas Babbitt, Reg. No. 39,591; Carol F. Barry, 41,600; Jordan Michael Becker, Reg. No. 39,602; Bradley J. Bereznak, Reg. No. 33,474; Michael A. Bernadicou, Reg. No. 35,934; Roger W. Blakely, Jr., Reg. No. 25,831; Gregory D. Caldwell, Reg. No. 39,926; Kent M. Chen, Reg. No. 39,630; Lawrence M. Cho, Reg. No. 39,942; Yong S. Choi, Reg. No. 43,324; Thomas M. Coester, Reg. No. 39,637; Roland B. Cortes, Reg. No. 39,152; Barbara Bokanov Courtney, Reg. No. P42,442; William Donald Davis, Reg. No. 38,428; Michael Anthony DeSanctis, Reg. No. 39,957; Daniel M. De Vos, Reg. No. 37,813; Tarek N. Fahmi, Reg. No. P41,402; James Y. Go, Reg. No. 40,621; Richard Leon Gregory, Jr., P42,607; Dinu Gruia, Reg. No. 42,996; David R. Halvorson, Reg. No. 33,395; Thomas A. Hassing, Reg. No. 36,159; James A. Henry, Reg. No. 41,064; Willmore F. Holbrow III, Reg. No. P41,845; George W. Hoover II, Reg. No. 32,992; Eric S. Hyman, Reg. No. 30,139; Dag H. Johansen, Reg. No. 36,172; William W. Kidd, Reg. No. 31,772; Tim L. Kitchen, Reg. No. P41,900; Michael J. Mallie, Reg. No. 36,591; Paul A. Mendonsa P42,879; Darren J. Milliken, P42,004; Thinh V. Nguyen, Reg. No. 42,034; Kimberley G. Nobles, Reg. No. 38,255; Michael A. Proksch P43,021; Babak Redjaian, Reg. No. 42,096; James H. Salter, Reg. No. 35,668; William W. Schaal, Reg. No. 39,018; James C. Scheller, Reg. No. 31,195; Anand Sethuraman, Reg. No. 43,351; Charles E. Shemwell, Reg. No. 40,171; Maria McCormack Sobrino, Reg. No. 31,639; Stanley W. Sokoloff, Reg. No. 25,128; Allan T. Sponseller, Reg. No. 38,318; Geoffrey T. Stanford, P43,151; Judith A. Szepesi, Reg. No. 39,393; Vincent P. Tassinari, Reg. No. 42,179; Edwin H. Taylor, Reg. No. 25,129; George G. C. Tseng, Reg. No. 41,355; Lester J. Vincent, Reg. No. 31,460; John Patrick Ward, Reg. No. 40,216; Stephen Warhola, P43,237; Charles T. J. Weigell, Reg. No. 43,398; Ben J. Yorks, Reg. No. 33,609; and Norman Zafman, Reg. No. 26,250, my attorneys; and Amy M. Armstrong, Reg. No. P42,265; Robert Andrew Diehl, Reg. No. P40,992; and Edwin A. Sloane, Reg. No. 34,728; my patent agents, with offices located at 12400 Wilshire Boulevard, 7th Floor, Los Angeles, California 90025, telephone (310) 207-3800, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Inventor's Signature Mark Johnson Date 25/6/02

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Australia

Full Name of Fifth/Joint Inventor _____

Inventor's Signature _____ Date. _____

Residence _____ Citizenship _____
(City, State) (Country)Post Office Address _____

Full Name of Sixth/Joint Inventor _____

Inventor's Signature _____ Date. _____

Residence _____ Citizenship _____
(City, State) (Country)Post Office Address _____
